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LAND 121 Lightweight Vehicle Driver Conversion Course Study Using A-SMART

Matthew Richmond and Graham Schliebs

Land Operations Division
Defence Science and Technology Organisation

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ABSTRACT

In this report we analyse Army's ability to conduct LAND 121 conversion training for the expected number of trainees in a timely manner. We make use of the Army Sustainability Modelling Analysis and Reporting Tool to forecast whether there is spare capacity (if any) for the required training staff to also instruct on the lightweight conversion course in addition to their other expected training responsibilities. Our modelling indicates that there is likely to be difficulty in sourcing the required Mechanic Vehicle - Corporal personnel to instruct on the conversion course; furthermore, there may be difficulty in sourcing the required Technician Electrical - Corporal instructors. It is recommended that the instructor establishment for Mechanic Vehicle - Corporal be increased by approximately two positions or for this role to be outsourced to contracted staff.

RELEASE LIMITATION

Approved for public release

APPROVED FOR PUBLIC RELEASE

LAND 121 Lightweight Driver Conversion Course Study Using A-SMART

Executive Summary

The introduction of the LAND 121 vehicle fleet requires relevant personnel to upgrade their skills on the new vehicle types by undertaking conversion training. This study investigates Army's ability to provide training to the expected number of trainees (approximately 2000 personnel) who will be required to undertake the Lightweight Vehicle Driver Conversion Course. We make use of the Army Sustainability Modelling Analysis and Reporting Tool (A-SMART) to investigate the capacity of the required instructor staff to provide the additional training on top of their usual training loads.

We have used historical recruitment and separation rates, career/training information and instructor/trainee availability limits to forecast training throughputs. The results show that of the five instructor types, Supervisor Transport CPL/SGT and Mechanic Vehicle SGT have sufficient spare instructor capacity; whereas Technician Electrical CPL has barely sufficient capacity and Mechanic Vehicle CPL has no spare capacity. Varying the historical recruitment and separation rates (± 25%) did not improve Mechanic Vehicle CPL instructor capacity. It is also noted that Mechanic Vehicle and Technician Electrical CPL are both trades that would deploy significant percentages of their unit establishments as a part of operational deployments (HQ Forces Command campaign plan) which would make it difficult to provide extra instructor staff from these trades/ranks.

It is recommended that the instructor establishment would need to be increased by two positions or contracted staff sourced to provide the instructor role normally filled by Mechanic Vehicle CPL. It may also be necessary to create one extra instructor position for Technician Electrical CPL.

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Contents

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Glossary

ACSC	Australian Command and Staff College
ADO	Australian Defence Organisation
AHQ	Army Headquarters
AITPIMS	Army Individual Training Plan Information Management System
ALTC	Army Logistics Training Centre
ARTC	Army Recruit Training Centre
A-SMART	Army Sustainability Modelling Analysis & Reporting Tool
CPL	Corporal
CL	Commercial Vehicle
CSS	Combat Service Support
D	Dump Truck
DTR	Directed Training Requirement
ECN	Employment Category Number
FY	Financial Year
GS	General Service
HC	Heavy Combination
HR	Heavy Rigid
IET	Initial Employment Training
LVDCC	Lightweight Vehicle Driver Conversion Course
MAE	Manual of Army Employment
MC	Multi Combination
PMKeyS	Personnel Management Key Solutions
RACT	Royal Australian Corps of Transport
RSM	Regimental Sergeant Major
SGT	Sergeant
TIR	Time In Rank
TMP	Training Management Package
VIP	Very Important Person
WO	Warrant Officer

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1. Introduction

The introduction of the LAND 121 vehicle fleet requires conversion training to be conducted to ensure that the skills of the relevant personnel are fully compliant with the new vehicles. This report provides analysis on Army's capacity to conduct LAND 121 conversion training for the expected number of trainees in a timely manner. The Army Sustainability Modelling Analysis and Reporting Tool (A-SMART) was used to model individual training across the Army (including all courses across all ranks and trade streams) and to investigate the spare capacity (if any) for the required training staff to also instruct on the lightweight conversion course (a five-day course for all drivers of the vehicles).[1,2] The trade streams impacted by this course are *Supervisor Transport – Driver* and *Supervisor Transport - Specialist Vehicle Operator*, as well as *RACT Officers*.

1.1 A-SMART Background

A-SMART is a strategic-level, force structure liability analysis tool, designed to support force structure decision-making and capability analysis; it is a dynamic modelling tool that assesses the ability of a force structure (including all entitlement data for the whole of the Army), current or planned, to meet readiness and operational requirements over the medium term (2-15 years). Although, major systems and supplies modules have also been developed, only the personnel module was used for this study and only for Regular personnel (and not Reservists).

Within the A-SMART application, personnel are modelled in accordance with their trade stream and rank; the tool currently contains 95 trade streams (across 19 corps), with ranks from Recruit to Warrant Officer Class 1 for Other Ranks and from Lieutenant through to Corporate (representing the ranks of Colonel and above) for Officers. Personnel levels within the force structure are modelled by incorporating the following aspects of personnel movements:
• individual training;
• collective training;
• promotion;
• recruitment;
• separation (during peacetime and including lateral transfers);
• attrition (during operations including battle and non-battle casualties);
• return to duty;
• deployment;
• reinforcement;
• reconstitution; and
• rotation.

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[1] At this point, data regarding maintenance conversion courses have not been provided and consequently they are not considered here; however, future work could include analysis of the LAND 121 roll-out and the impacts on maintenance personnel.

[2] Note that it is envisaged that Medium/Medium-Heavy and Integrated Load Handling conversion courses would also be required for drivers; however, data describing these courses have not been available at the time this study was conducted and hence are not considered here.

A-SMART has been developed as a deterministic, discrete-time, dynamic model which employs Markov modelling techniques. The model uses monthly time steps and personnel are defined by allocation to classes. Classes define personnel by experience (time-in-rank and training levels) and by phase. For the purposes of modelling, a trade stream is defined as a linear progression through a career profile from the lowest to highest rank. To qualify for promotion between ranks personnel must complete both a minimum time in rank (TIR) period and the course requirements. The personnel module uses information relating to recruitment, wastage (separation and attrition) and promotion rates (constrained by trainee and instructor availability) to calculate personnel movements and links the demand (unit establishment) with the forecast available population. At the start of each time-step appropriate separation rates are applied to each class; gaps are determined by comparing the personnel levels, after separation rates are applied, with the targets. Algorithms then define a priority sequence that attempts to fill these gaps, as gaps propagate down through the classes.

The main outputs of the A-SMART personnel module are forecast personnel populations, instructor levels, and trainee throughput (for each course). Plots can be filtered by personnel type (including corps, rank and trade). Further details on using and interpreting results from A-SMART can be sourced from the User Manual [1].

The report consists of five main sections. Section Two discusses the input data. The results of the model runs are presented in Section Three. Section Four includes a discussion of the model results. Section Five provides conclusions for this study and suggestions on how the work could be extended as a part of future studies.

2. Model Inputs

2.1 Unit Establishment Data

The personnel entitlement data were obtained from PMKeyS in May 2009. For this study, a data dump for 2011 (as at 01 February) was used as this best correlates with the planned roll-out of the LAND 121 fleet; the PMKeyS query included all full-time Army positions in the ADO. The A-SMART data loader automatically loads data sets making use of the Army organisational structure file, also obtained from PMKeyS; PMKeyS contains only one organisational structure file that lists all units in the Army and links their command structure by using a number to describe the "tree level" and the rank at which that units appear in the order of the list. Note that we are only considering Regular personnel; data for Reserves were not loaded.

Career progression information, including individual training aspects, is defined by Employment Category Number (ECN) and is detailed in the relevant Manual of Army Employment (MAE) and Training Management Package (TMP) documents. A-SMART makes use of this information to model personnel movements over time and consequently the personnel entitlement data must be processed with jobcodes linking to the appropriate ECNs. If a jobcode links to multiple ECNs or an ECN occurs in multiple trade streams then the personnel entitlement will be split; unless set by the user, incumbent skill grade data (that is,

ECNs) are used to link jobcodes to trade streams by using a PMKeyS query that provides a full list of regular Army incumbents against their position details.

2.2 Recruitment & Separation Rates

Default separation data were taken to be the historical 12-month rates from July 2007 and recruitment rates were set as the targets from the same period (not achievement).

2.3 Career Profiles and Course Data

Career profile data were sourced from MAE and TMP documents in a manual process; this may have led to some omissions and errors. The career profile data include minimum TIR periods and the courses (including the order in which the courses must be completed) for every Army trade.[3] For example, in the *RACT Officer* stream in the screenshot below (Figure 1), at the rank of Lieutenant there is a minimum TIR of 3.5 years and four courses[4] that require completion before qualifying for promotion. Each course has data loaded, including its length and the number/type of instructors required; for example, Figure 2 below shows the details for the *Logistic Officer Basic Course RACT Module* course. Note that the course is for 22 days and requires four instructors (1x *RACT Major* and 3x *RACT Captain*) plus two assistants (1x *RAAOC Corporal ECN 071* and 1x *RAAOC Corporal ECN 294*).

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[3] Note it is necessary to consider all trades, not just those trades affected by the driver conversion courses, as instructors are often required for courses across multiple trades which reduces their availability to instruct on the conversion courses.

[4] There are three mandatory courses plus one of three electives that must be completed by RACT Lieutenants. The mandatory courses are, Logistic Officer Basic Integrated Logistics Module, Logistic Officer Basic Course RACT Module and Grade 3; the electives are Movement Officers Course, Logistic Officers Amphibious Course and Air Logistic Officers Course.
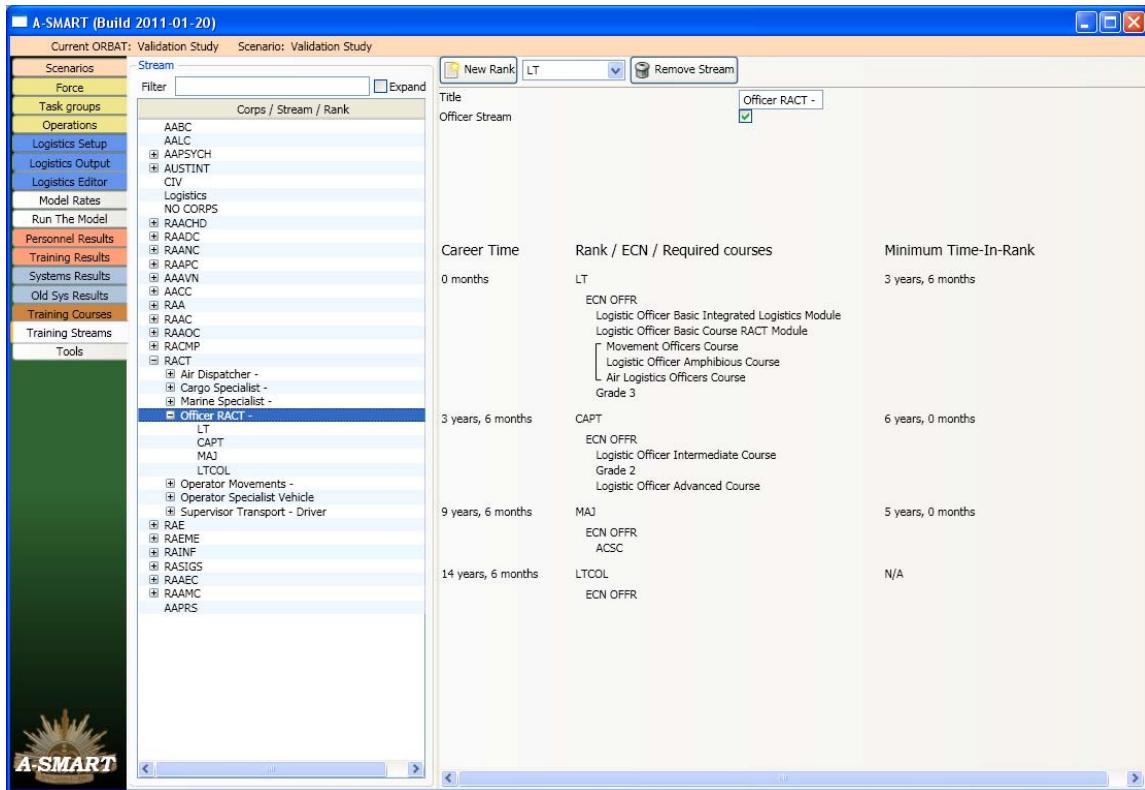
Figure 1: Career Profile for an RACT Officer
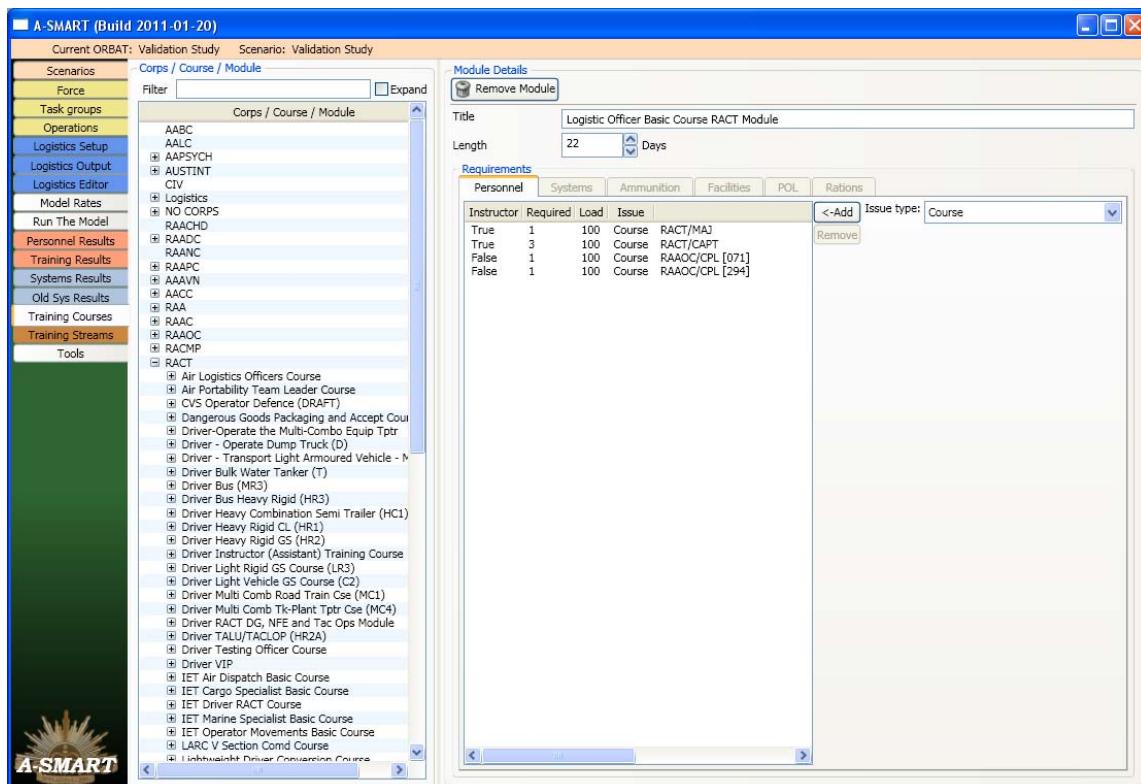
Figure 2: Course Data for Logistic Officer Basic Course RACT Module

2.3.1 Trade Streams Investigated

The career profiles for the three streams considered in this study are presented below; namely *RACT Officers*, *Supervisor Transport - Driver* and *Supervisor Transport - Operator Specialist Vehicle*.

2.3.1.1 RACT Officers Career Profile

The career profile data that have been loaded for RACT Officers are:
- **Lieutenant** Logistic Officer Basic Integrated Logistic Module, Logistic Officer Basic Course RACT Module and Grade 3 Course plus a course from:
  o Movement Officers Course,
  o Logistic Officer Amphibious Course, or
  o Air Logistic Officers Course, plus six years TIR.
- **Captain** Grade 2 Course, Logistic Officer Intermediate Course and Logistic Officer Advanced Course plus six years TIR.
- **Major** ACSC plus five years TIR.
- **Lieutenant Colonel**.

2.3.1.2 RACT Supervisor Transport – Driver Career Profile

The career profile data that have been loaded for Supervisor Transport – Driver are:
- **Recruit** (510-0) Army Recruit Course and IET Driver RACT Course plus six months TIR;
- **Private** (109-1) Two courses from:
  o Driver – Heavy Rigid GS (HR2),
  o Driver – Heavy Rigid CL (HR1),
  o Tow a Multi Axle Trailer over 9 tonnes (HR4),
  o Tow a Trailer two to nine tonnes (MR4),
  o Driver – VIP,
  o Driver – Operate a Dump Truck (D),
  o Operator Bulk Fuel Tanker,
  o Driver – (Coach) Heavy Rigid (HR3),
  o Operate a Vehicle Mounted Crane,
  o Driver Bus (MR3),
  o Driver Forklift (On and Off Pavement), or
  o Subject 1 CPL (now junior leadership course) and plus two years TIR.
- **Lance Corporal** (109-2) Advanced Road Transport Course and Transport Management Course and plus one year TIR.
- **Corporal** (109-3) Driver Instructor Testing Officer Course and Supervisor Road Transport Course, (381-2) Subject 1 SGT plus three years TIR.
- **Sergeant** (381-3) Subject 1 WO and Subject 2 WO CSS plus three years TIR.
- **Warrant Officer Class 2** (381-3) three years TIR.
- **Warrant Officer Class 1** (381-3), (350-0) RSM course.

2.3.1.3 RACT Supervisor Transport – Operator Specialist Vehicle Career Profile

The career profile data that have been loaded for Supervisor Transport – Operator Specialist Vehicle are:
- **Recruit**, (510-0) Army Recruit Course and IET Driver RACT Course plus six months TIR.
- **Private** (109-2) Two courses from:

- o Driver – Heavy Rigid GS (HR2),
- o Driver – Heavy Rigid CL (HR1),
- o Tow a Multi Axle Trailer over nine tonnes (HR4),
- o Tow a Trailer two to nine tonnes (MR4),
- o Driver – VIP,
- o Driver – Operate a Dump Truck (D),
- o Operator Bulk Fuel Tanker,
- o Driver – (Coach) Heavy Rigid (HR3),
- o Operate a Vehicle Mounted Crane,
- o Driver Bus (MR3),
- o Driver Forklift (On and Off Pavement), or
- • (274-1) a course from:
- o Driver - Multi Combination Road Train (MC1),
- o Driver - Multi Combination Tank & Plant Transport (MC4),
- o Driver - Heavy Combination Semi Trailer (HC3),
- o Operator Bulk Fuel Tanker, or
- o Subject 1 CPL plus one year TIR.
- • **Lance Corporal** (274-2) Advanced Road Transport Course and Transport Management Course plus two years TIR.
- • **Corporal** (274-2) Driver Instructor Testing Officer Course and Subject 1 SGT, (381-2) Supervisor Road Transport Course plus three years TIR.
- • **Sergeant** (381-3) Subject 1 WO and Subject 2 WO CSS plus three years TIR.
- • **Warrant Officer Class 2** (381-3) three years TIR.
- • **Warrant Officer Class 1** (381-3) (350-0) RSM course.

2.3.2 Conversion Course Data

Data were provided for a Lightweight Vehicle Driver Conversion Course (LVDCC) by the LAND 121 Program Office, which included the length of the course, the number of students per course and the number and type (by rank and ECN) of instructors required to teach the course:

- • Duration - five days;
- • Number of students per course – 18 trainees;
- • Instructors required:
    - o ECN 381 Supervisor Transport Sergeant (x 2);
    - o ECN 381 Supervisor Transport Corporal (x 2);
    - o ECN 229 Mechanic Vehicle Sergeant (x 1);
    - o ECN 229 Mechanic Vehicle Corporal (x 2); and
    - o ECN 418 Technician Electrical Corporal (x 1).

2.3.2.1 Number of Course Participants

The number of Army personnel that are required to complete the course was estimated from the personnel establishment data (1608, see Table 1) and this figure was increased to cater for additional personnel from RAAF (approx. 200) and Navy (approx. 200) who would also be trained for this vehicle rollout to give a requirement to train approximately 2000 personnel.

Table 1: LVDCC Course Trainees (Source: PMKeyS May 2009)

Trade	Number of Personnel
RACT Officer	326
Supervisor Transport - Driver	1058
Supervisor Transport – Operator Specialist Vehicle	224
Total	1608

2.3.2.2 Lightweight Vehicle Driver Conversion Course Instructor Demand

It is expected that the lightweight vehicle fleet will be rolled out over a three-year period starting in 2011 and that the driver conversion training must be completed within this period.

To provide training for the estimated number of course participants 111 courses are required (2000 personnel with 18 trainees per course). We can then calculate the number of instructor days that are required for each instructor type (111 courses x 5 days course duration x number of instructors required) and convert it into the average staff years by dividing by the total number of training days available (assuming 40 training weeks per year for 3 years = 600).

Table 2: Average number of LVDCC courses and instructors required (in staff years)

Number of Trainees	Number of Courses	Number of Instructors (ECN 381 Supervisor Transport Sergeant) (Staff Years)	Number of Instructors (ECN 381 Supervisor Transport Corporal) (Staff Years)	Number of Instructors (ECN 229 Mechanic Vehicle Sergeant) (Staff Years)	Number of Instructors (ECN 229 Mechanic Vehicle Corporal) (Staff Years)	Number of Instructors (ECN 418 Technician Electrical Corporal) (Staff Years)
2000	111	1.85	1.85	0.93	1.85	0.93

2.3.3 Availability of Trainees and Instructors

Limits on the availability of personnel to be trainees and instructors are set in A-SMART as a percentage of the unit establishment for any force element and at any level in the force hierarchy by rank and trade. The availability of trainees/instructors is also limited if operations are set up, as personnel are unavailable for individual training if they are classified as deployed.[5] The baseline rates have been set to 10% for trainees; i.e. only one in every ten personnel is allowed to undertake individual training at any time. Note that these rates are not applied to recruits or personnel that are excess to unit requirements at any other rank; these personnel are 100% available to train.

We were unable to obtain specific data (that is, by rank and trade) for the maximum number of personnel available to be instructors and support staff for courses. Guidance was provided (by the IIS training Manager, Overlander Program) that instructor/support staff availability is likely to be approximately 90% of the personnel entitlement in training schools (centralised

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[5] As no operations have been set up for this study this deployment-based unavailability is not relevant here.

training) and approximately 1% for the remainder of the Army (de-centralised training). By assuming that a percentage of entitlement levels can be set for instructors across all ranks and trades, the model outputs will not present any specific issues that may arise from a lack of instructor availability in a particular rank or trade. Furthermore, we only constrain trainee throughput by trainee and instructor availability. Consequently, other factors which may limit trainee throughput (e.g. a lack of facilities or major systems) are not considered leading to more trainees completing courses than might be otherwise expected; that is, if the A-SMART output suggests that there are insufficient personnel being trained then the real situation is likely to be worse.

3. Results

This section is made up of two parts. The first part presents the results of the baseline model run, including model outputs compared with historical data and the available capacity of instructors to provide conversion course training. The second part provides "what-if" analysis regarding the impact of possible increases/decreases to recruitment and separation rates, across the force, on available instructor capacity to conduct the conversion course training.

3.1 Baseline Model Run

A base model run was set up to:
1. Assist in validation of the model input parameters by comparing forecast trainee throughputs with historical data; and
2. provide a baseline for the expected instructor usage (across all relevant courses) and therefore indicate whether there is spare capacity in the relevant instructor types required for the conversion course.

3.1.1 Validation of Baseline Model Run

In this section we compare directed training requirements (DTRs)[6] with the trainee throughputs forecast from the baseline A-SMART model run to validate the model input parameters that were used in this study. The average DTRs for the three financial years from start July 2007 to end June 2010 are compared to the forecast trainee throughputs from the A-SMART baseline model run 12-month average (from 36-month model run). For Officers (Table 3), the model results generally compare favourably with the DTRs, especially when considering the DTR variance across FYs. The exceptions are for the elective courses (highlighted in Table 3). For the elective courses, the model results show that there is no constraint on personnel completing the course and that there are simply not sufficient personnel who are required to complete it when compared with the DTR; however, it should be noted that for the two elective courses that have much higher DTRs than the A-SMART results, there was a considerable increase in the last two FYs which may have been due to

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[6] These data were obtained from the Army Individual Training Plan Information Management System database (AITPIMS database).

issues not considered by the model. Overall the ratio of the sum across all of the RACT Officer courses for the DTR Average to A-SMART is 1.06 which provides a very good correlation.

Table 3: RACT Officer Courses

RACT Officer Courses	PMKeyS Course Code	DTR 07/08	DTR 08/09	DTR 09/10	DTR (Average)	ASMART Trained (Average)
Logistic Officer Basic RACT	200247	29	26	21	25	23
Officer Grade 3	200724 or 207961/2/3	381	80	285	249	203
Movement Officers Course	120051	9	14	18	14	6
Water & Terminal Operations - Amphibious Log Officers Course	114008	7	13	41	20	6
Basic Air Logistic Officer Course	120040	10	8	6	8	6
Officer Grade 2	200723 or 207708/09/11	271	285	290	282	281
Logistic Officer Intermediate RACT	200252	20	36	23	26	22
Logistic Officer Advanced	120089	72	81	133	95	120
ACSC	Joint course	80	80	80	80	85[7]

For the relevant other ranks the results also generally compare well except for the elective courses[8], the Subject 4 Corporal Advanced Road Transport course and the Transport Management Course (highlighted in Table 4). For the elective courses (many of which are outsourced) we have assumed that they are equally popular as we were unable to obtain data on their demand; consequently it is difficult to interpret the discrepancies. For the Subject 4 Corporal Advanced Road Transport and Transport Management Courses the modelling results forecast about double the expected trainee throughputs which suggests that there are other constraints on training throughputs (e.g. facilities or reduced student demand, say due to operational deployments). Overall the ratio of the sum across all of the RACT Operator Specialist Vehicle and Supervisor Transport - Driver courses for the DTR Average to A-SMART results is 0.91, which provides a good correlation.

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[7] We assume that 50% of Officers attend staff college.

[8] Note that data were not available in the AITPIMS database for some courses, the training for which is presumably outsourced.

Table 4: RACT Operator Specialist Vehicle and Supervisor Transport - Driver Courses

Supervisor Transport Courses	PMKeyS Course Code	DTR 07/08	DTR 08/09	DTR 09/10	DTR (Average)	A-SMART Trained (Average)
Army Recruit Course	204549	4050	3561	3678	3763	3508
IET Driver RACT	200028	431	432	382	415	338
Driver Heavy Rigid GS (HR2)	120080	42	43	45	43	152
Tow a Trailer over 9 Tons (HR4)	200727	48	-	-	48	60
Driver VIP	200282	21	16	20	19	60
Operate a Dump Truck	200301	-	-	-	-	60
Operate Bulk Fuel Tanker (B)	120075	120	110	102	111	66
Driver Bus Heavy Rigid (HR3)	200276	-	-	-	-	80
Driver Multi Combination Road Train (MC1)	200323	-	-	-	-	78
Driver Multi Combination Tank/Plant Trans (MC4)	200057	21	17	24	21	83
Driver Heavy Comb Semi Trailer (HC1)	200056	36	39	40	38	49
TTF Fleetliner Op Course	202610	10	-	-	10	26
Operate Vehicle Mounted Crane	200302	-	-	-	-	60
Junior Leadership Course (SUBJ 1 CPL)	202960	1975	1754	1754	1828	1879
Subject 4 Corporal Advanced Road Transport	120059	84	84	80	83	175
Transport Management Course	200273	93	94	94	94	183
Driver Testing Officer	120082	56	72	106	78	77
Subject 4 Sergeant Supervisor Road Transport	120060	27	48	68	48	75
SUBJ 1 SGT	202876	953	926	927	935	1197
Subject 1 WO	202881	497	531	531	520	686
Subject 2 WO CSS RACT	200253	25	25	25	25	37
RSM	120024	40	40	34	38	34[9]

3.1.2 Instructor Capacity for Conversion Courses

The plots presented in this section show the number of instructors (y-axis) that have been allocated to instruct, across all of the courses for which they are required, for each month of the model run (x-axis). The number of instructors allocated to each course has been stacked

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[9] We assume that 10% of WO1 attend the RSM course.

with a blue line across the top which represents the total number of instructors that have been allocated across all courses; each course has been shaded with a colour which is defined in the legend at the top of each plot. There is a black line at the top of each plot that indicates the total number of instructors available (given the assumptions that we have made see Section 2.3.3); note that we have placed this line at the top of the scale in each plot which means that the scales are inevitably different in each of the plots. Any gap between the black line (total instructors available) and the blue line (total instructors allocated) represents spare instructor capacity.

The baseline run model results (Figures 3 to 9) indicate that there is spare capacity for all instructor trades to conduct conversion training at the necessary level (within the required three-year period) except ECN 229 Mechanic Vehicle Corporal which is fully allocated for the duration of the three-year period (Figure 8). Of the 173 Mechanic Vehicle Corporals within the Army entitlement data our assumptions on instructor availability indicate there are about eight instructors available; three in ARTC and five in ALTC. The majority of Mechanic Vehicle Corporal Instructors have been allocated to teach on the Mechanic Vehicle IET Course. For ECN 418 Technician Electrical there is barely sufficient spare instructor capacity; again most instructors are allocated to teach IET training (Figure 9).
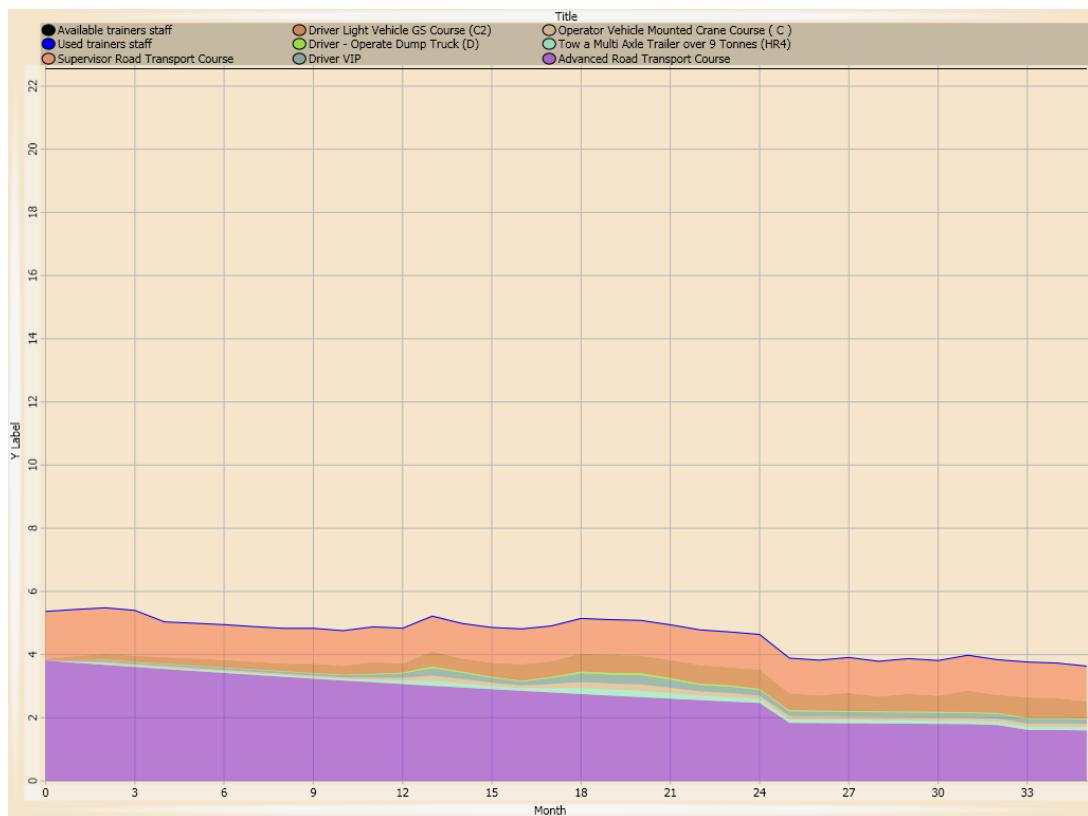
Figure 3: Supervisor Transport - Driver SGT (stacked plot of the allocation of instructors to courses)
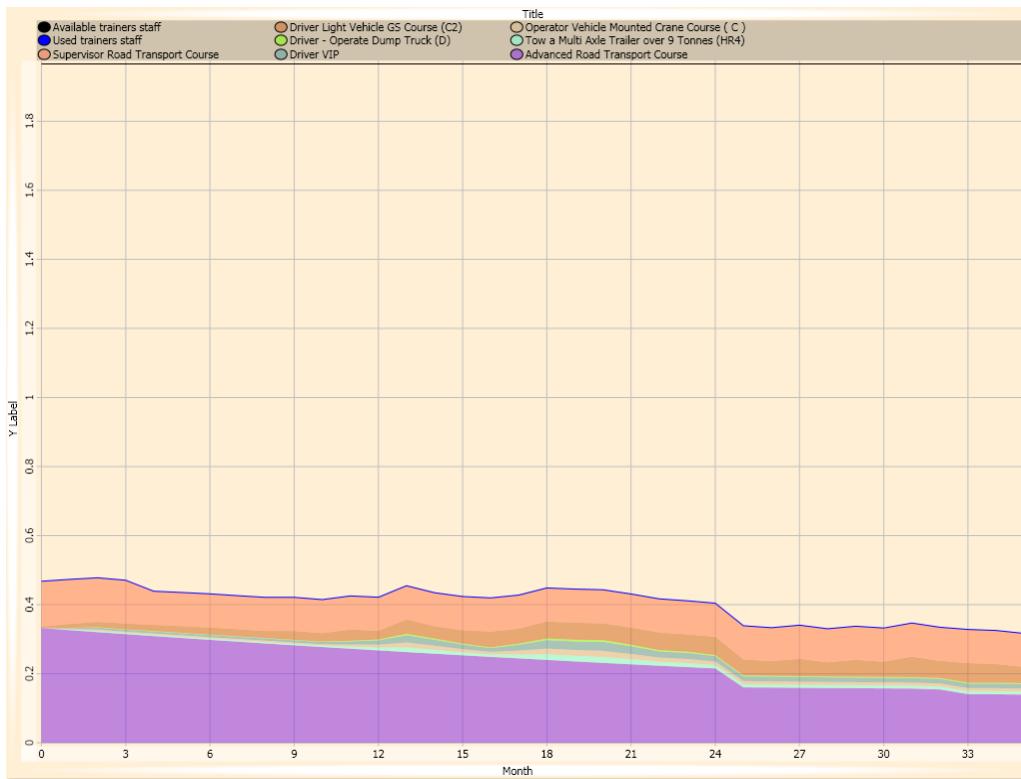
Figure 4: Supervisor Transport - Operator Specialist Vehicle SGT (stacked plot of the allocation of instructors to courses)
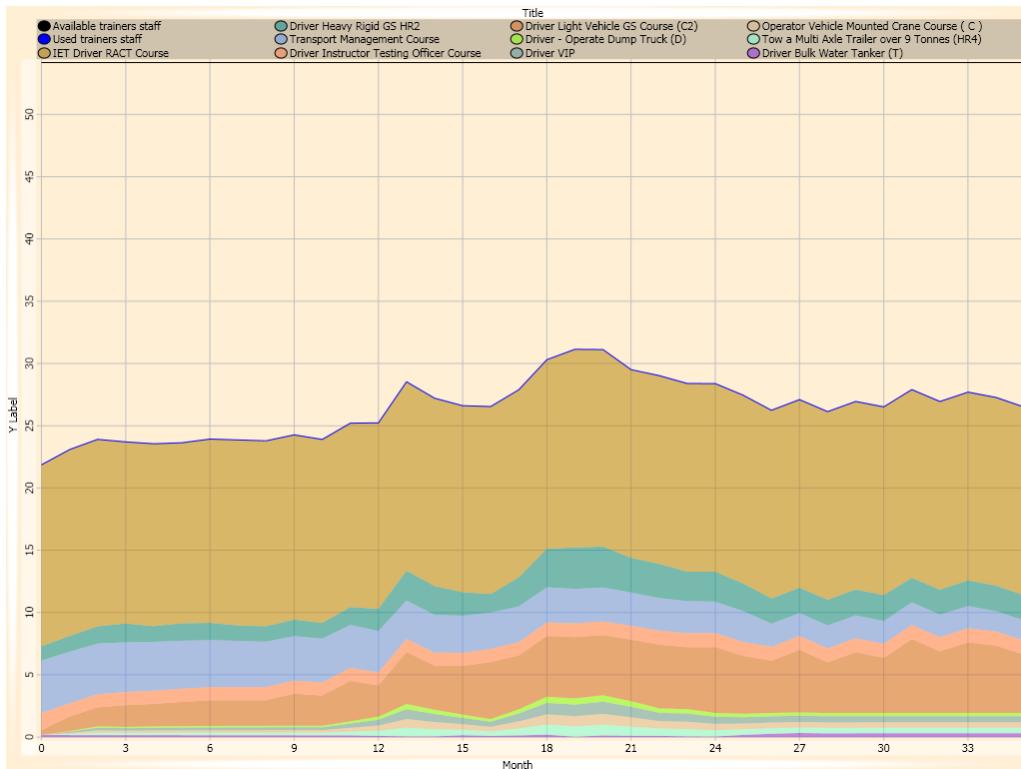
Figure 5: Supervisor Transport - Driver CPL (stacked plot of the allocation of instructors to courses)
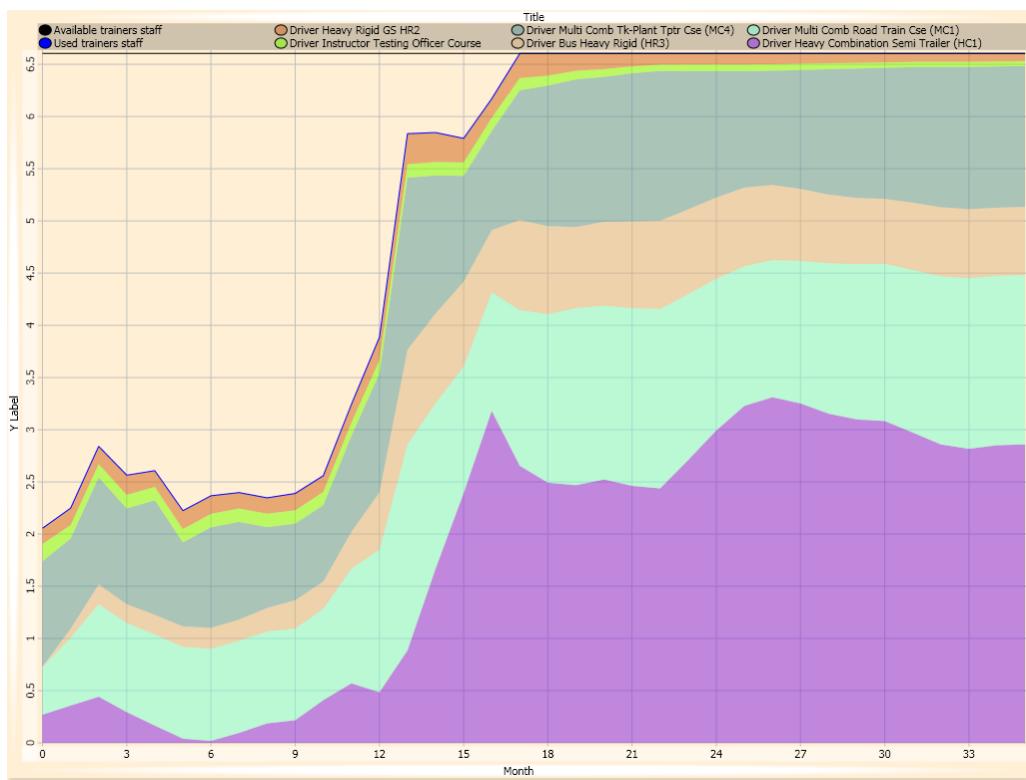
Figure 6: Supervisor Transport - Operator Specialist Vehicle CPL (stacked plot of the allocation of instructors to courses)
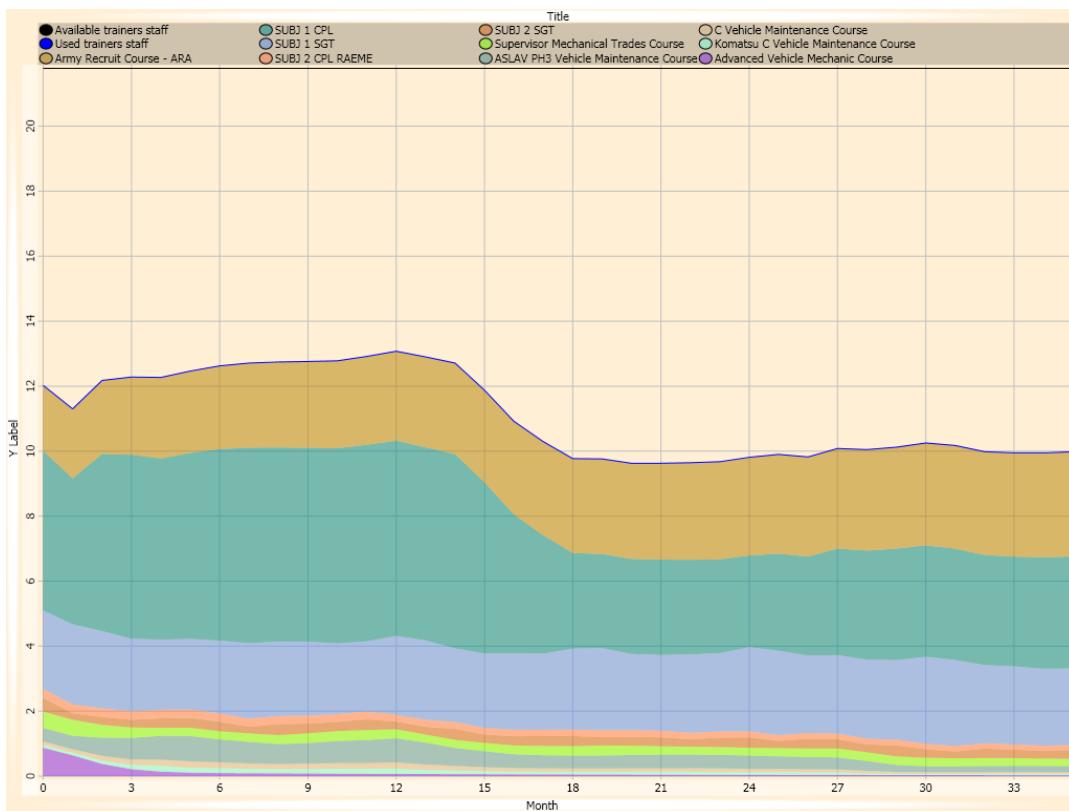
Figure 7: Mechanic Vehicle SGT (stacked plot of the allocation of instructors to courses)
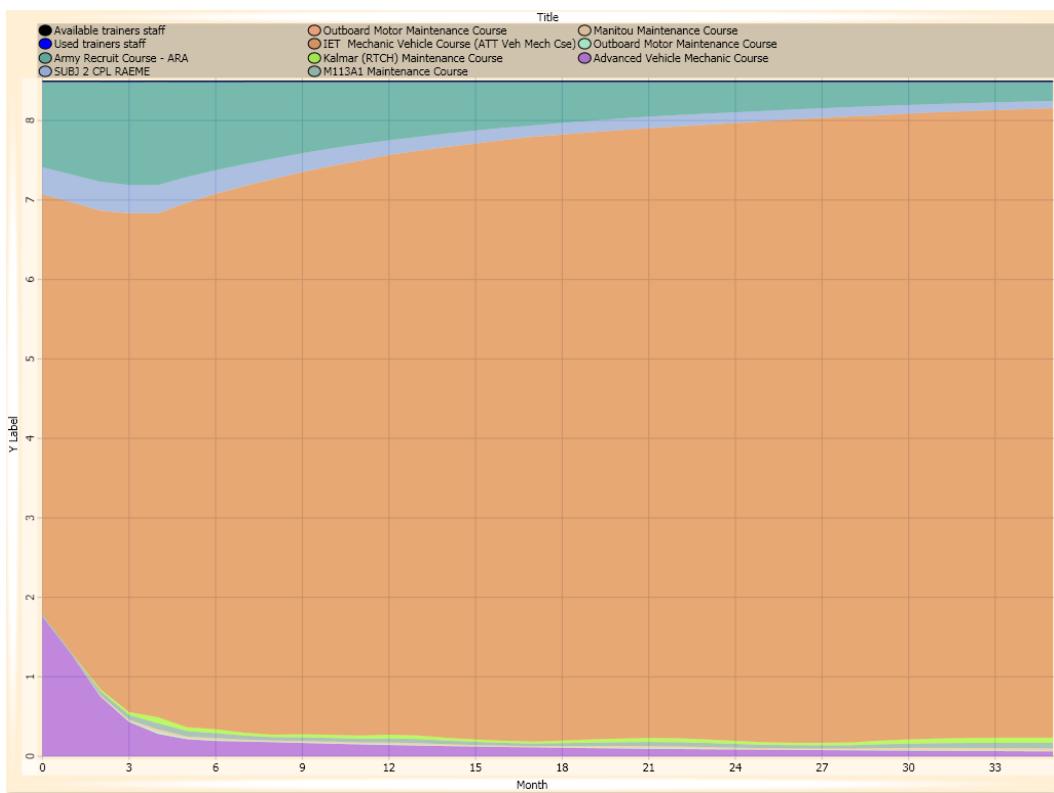
Figure 8: Mechanic Vehicle CPL (stacked plot of the allocation of instructors to courses)
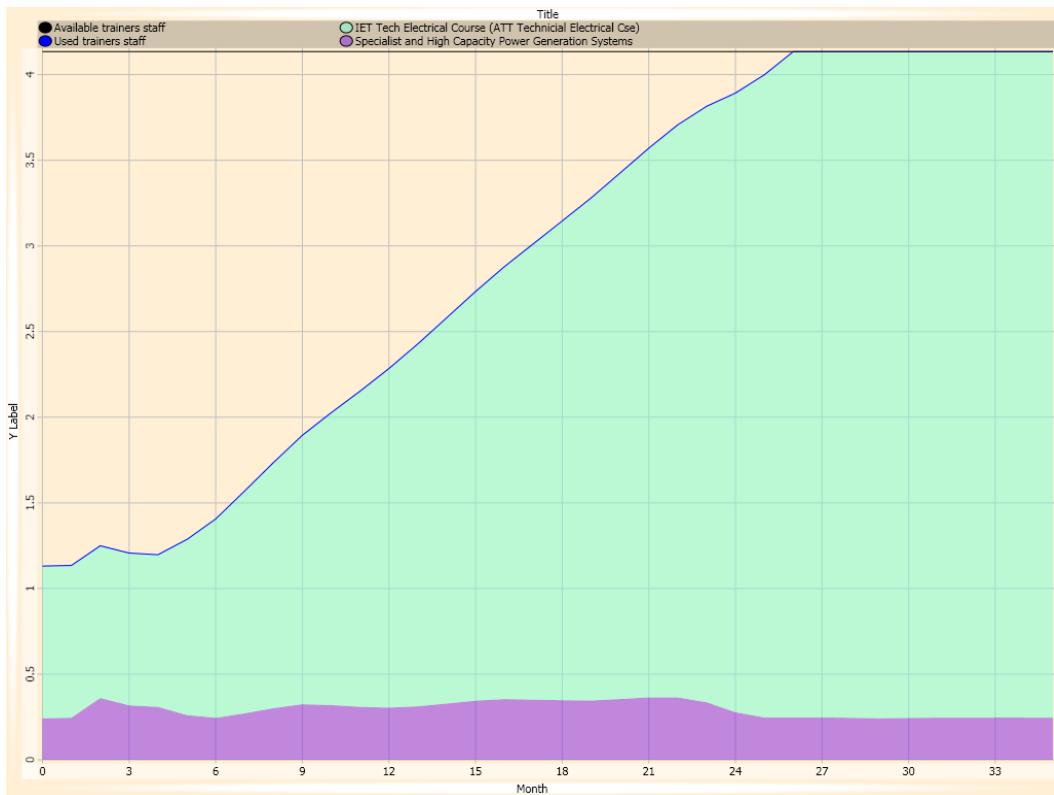
Figure 9: Technician Electrical CPL (stacked plot of the allocation of instructors to courses)

3.2 Basic Parametric (What-if) Analysis

Two key input parameters, recruitment and separation rates, were varied (±25% of the historical rate) to forecast any impact on the ability to provide sufficient instructors for the conversion course training.

3.2.1 Recruitment Rates

3.2.1.1 *Recruitment +25%*

Increasing recruitment rates by 25% for all ranks and trades did not have a significant impact on the number of instructors available for the rank/trades of interest here. Only Technician Electrical CPL decreased its spare capacity to a level that would make it difficult to complete all conversion training (Figure 16). See the Appendix Section 7.1.1 for stacked plots of the allocation of instructors to courses for each of the instructor trades relevant to this study.

3.2.1.2 *Recruitment -25%*

Decreasing recruitment by 25% for all ranks and trades did not free up any capacity in Vehicle Mechanic CPL with all available instructors allocated even when there is less recruits entering the Army (see Appendix Section 7.1.2 for stacked plots of instructor allocation to courses).

3.2.2 Separation Rates

3.2.2.1 *Separation Rates -25%*

Decreasing separation rates by 25% for all ranks and trades did not free up any spare capacity in Vehicle Mechanic CPL with all available instructors allocated even when more personnel are staying with the Army (see Appendix Section 7.1.3 for stacked plots of instructor allocation to courses).

3.2.2.2 *Separation Rates +25%*

Increasing separation rates by 25% for all ranks and trades had only a limited impact on the instructor results (see Appendix Section 7.1.4 for stacked plots of instructor allocation to courses).

3.2.3 Operations

The model runs during this study have not considered the impact of operations on the capacity of instructors to also teach on the conversion course. Depending on the make-up of any operations, in terms of the rank/trade mix of personnel deployed, they could increase instructor spare teaching capacity (by reducing student loads) or reduce it (if qualified instructors are deployed on operations). In 2009, A-SMART was employed to assist in investigating the personnel sustainability of the Approved Future Force against the Headquarters Forces Command (FORCOMD) campaign plan operational scenarios [2-3]. Of the trades that are required to complete the lightweight vehicle driver conversion course, approximately 14% of the unit establishment would be deployed at any time in the FORCOMD campaign plan scenario. Of the instructors required for the lightweight conversion course again approximately 14% would be deployed at any time in the FORCOMD campaign plan scenario. However, when the specific instructor types are considered, these

rates vary from 18% for Mechanic Vehicle CPL and Technician Electrical CPL, to 16% for Mechanic Vehicle SGT, to only 12% for Supervisor Transport CPL and SGT. Furthermore, the results from this study highlighted both Mechanic Vehicle CPL and Technician Electrical CPL as critical trades. Consequently, for the FORCOMD campaign plan scenario, the two trades which have the least spare instructor capacity, Mechanic Vehicle CPL and Technician Electrical CPL, are the trades most likely to be negatively impacted by the operations which represents a significant risk for the conduct of the lightweight vehicle driver conversion course training.

4. Discussion

The results of our analysis indicate that of the five rank/trades that are required to instruct on the lightweight vehicle driver conversion course there would be sufficient spare capacity in Supervisor Transport SGT/CPL and Mechanic Vehicle SGT without allocating extra instructor staff to the training schools, and that Technician Electrical CPL is borderline; however, there is no spare capacity in Mechanic Vehicle CPL. Furthermore, any operations are likely to exacerbate the lack of instructor capacity in Mechanic Vehicle and Technician Electrical CPL. To remedy this problem instructors from the higher rank of SGT, where there is spare capacity, could be employed to instruct on the lightweight vehicle driver conversion course. If this is deemed unsuitable other options include contracting out the role of Mechanic Vehicle (and possibly Technician Electrical) or to increase the personnel establishment of the training schools by two positions for Mechanic Vehicle CPL (and possibly one for Technician Electrical CPL) for the three years during which the lightweight vehicle driver conversion courses will be run; see Table 2 for the estimated number of instructors required to instruct on the lightweight vehicle driver conversion course over the three-year roll-out of the fleet.

5. Conclusions

The Army Sustainability Modelling Analysis and Reporting Tool (A-SMART) was employed to investigate personnel sustainability and training issues that may arise from running a lightweight conversion course for drivers, planned to support the roll-out of the LAND 121 fleet. The modelling indicates that the Mechanic Vehicle CPL instructor levels required to run the proposed five-day lightweight vehicle driver conversion course within the requisite three-year timeframe (approximately two positions) could only be achieved by either increasing instructor staffing within the training schools, employing instructors from higher ranks where spare capacity exists or using contracted support for the role. There is also a moderate risk for Technician Electrical CPL, especially if the Army becomes involved in increased operational deployments. Future work could investigate the other conversion training that will be required for Land 121 and more thorough analysis on the impact of operations on training throughputs could be conducted; clearly this work could only proceed with the engagement and guidance of the relevant Army staff, especially in regards to model input parameters.

6. References

1. Richmond, M.K., Stewien, J., Zucchi, M., Roth, A., Miller, S. and Do, S. (2009). Army Sustainability Modelling Analysis and Reporting Tool Phase 1: User Manual and Results Interpretation Guide, DSTO-GD-0595
2. Richmond, M.K. (2009). Army Force Generation Study; Personnel Sustainability Analysis of the Campaign Plan Using A-SMART (U) DSTO-CR-2009-0173
3. Richmond, M.K. and Hughes, D. (2009). Army Force Generation Study; Personnel Sustainability Analysis of the Campaign Plan Using A-SMART Part 2 (U) DSTO-CR-2009-0304

7. Appendix

7.1 Stacked Plots Showing Instructor to Courses

7.1.1 Recruitment Rates +25%
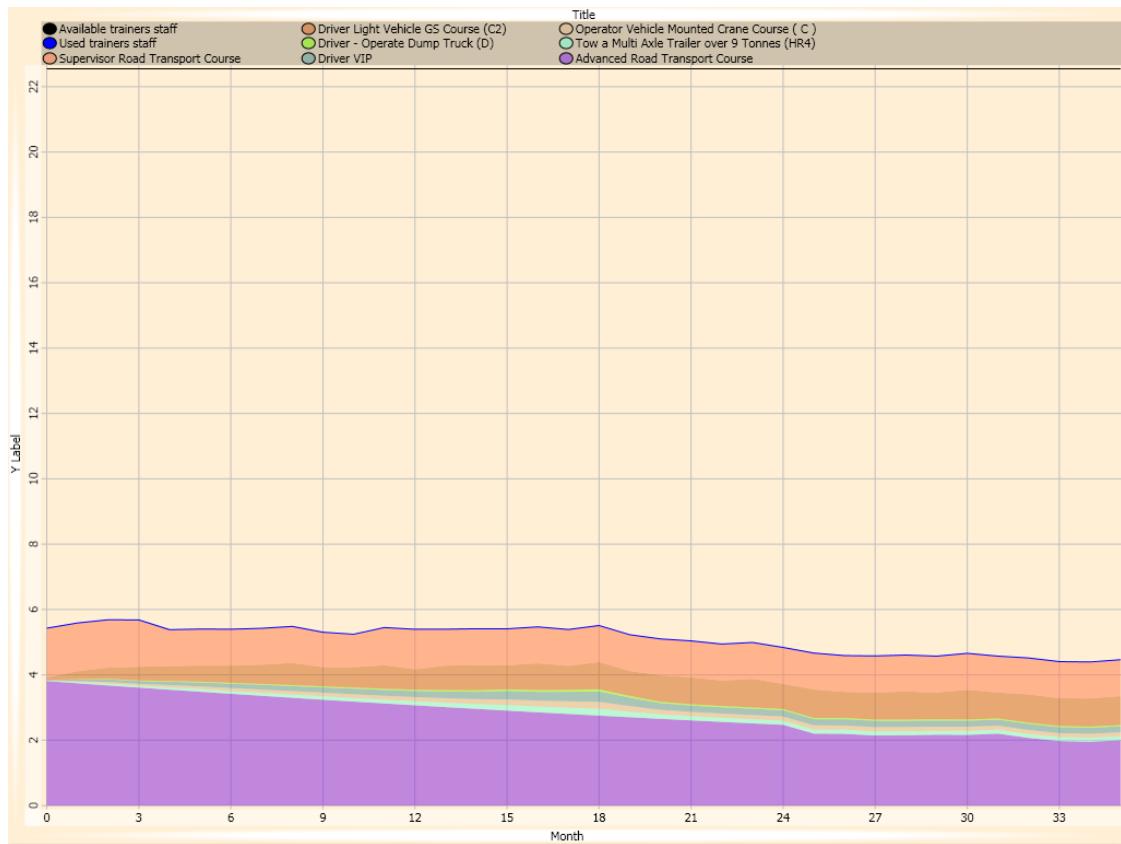
Figure 10: Supervisor Transport - Driver SGT
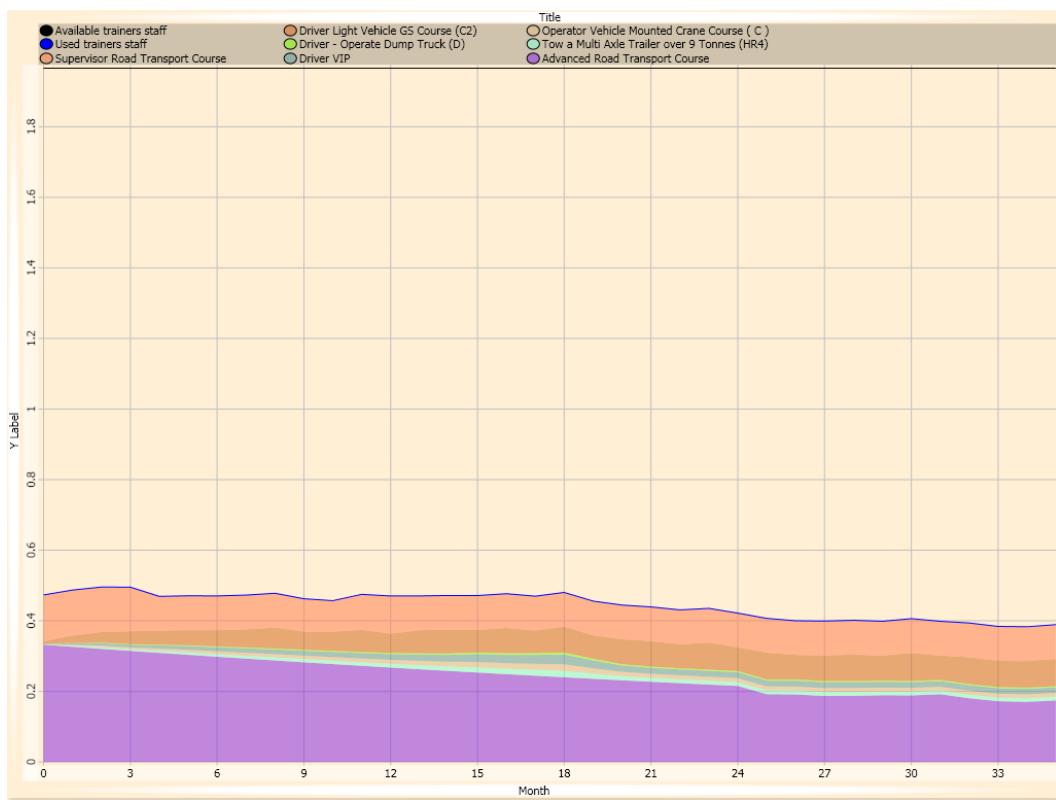
Figure 11: Supervisor Transport - Operator Specialist Vehicle (recruitment +25%)
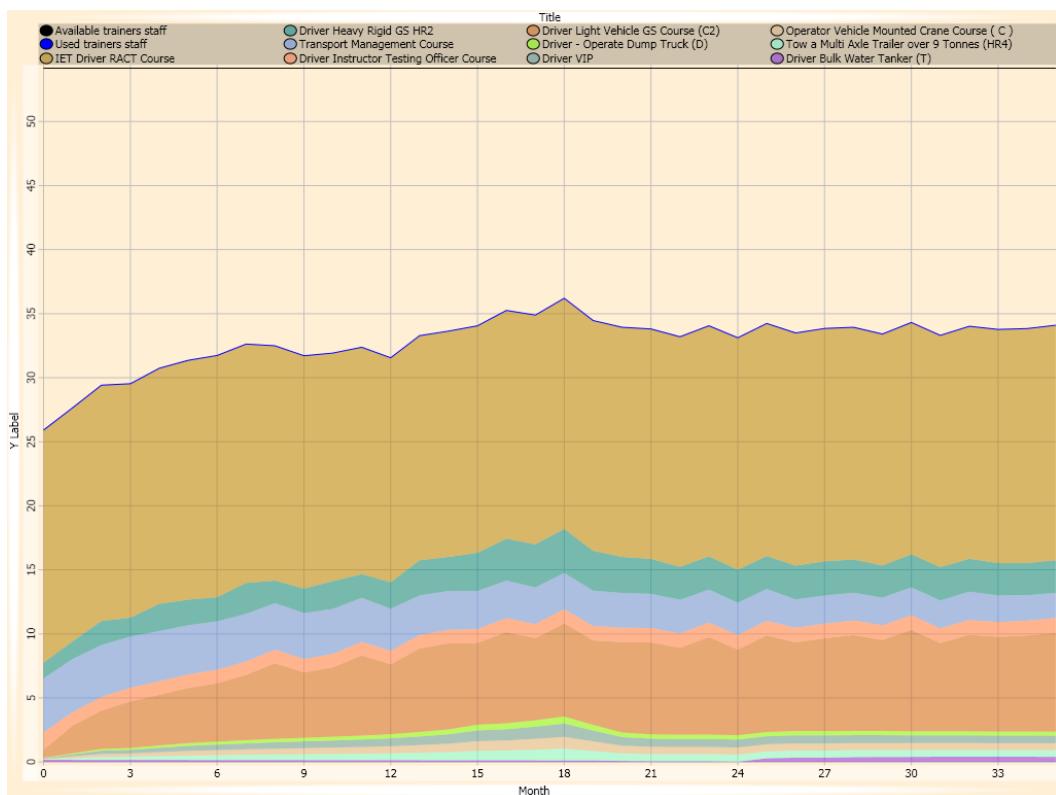

Figure 12: Supervisor Transport - Driver CPL
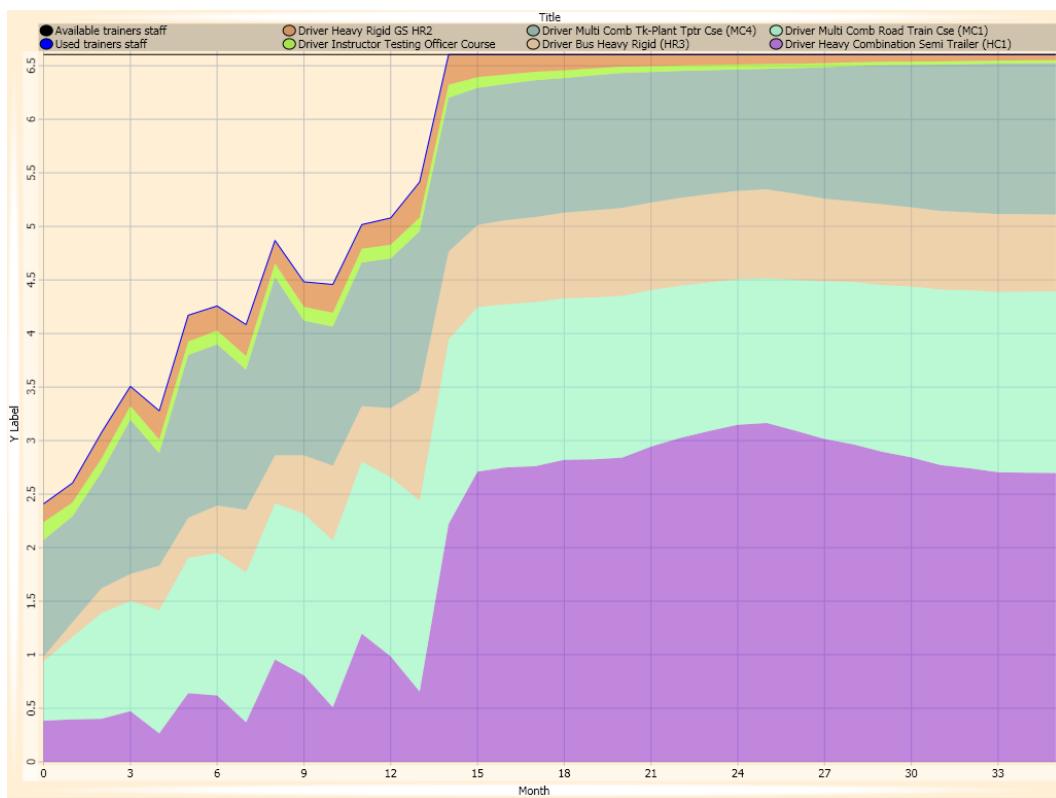
Figure 13: Supervisor Transport - Operator Specialist Vehicle CPL
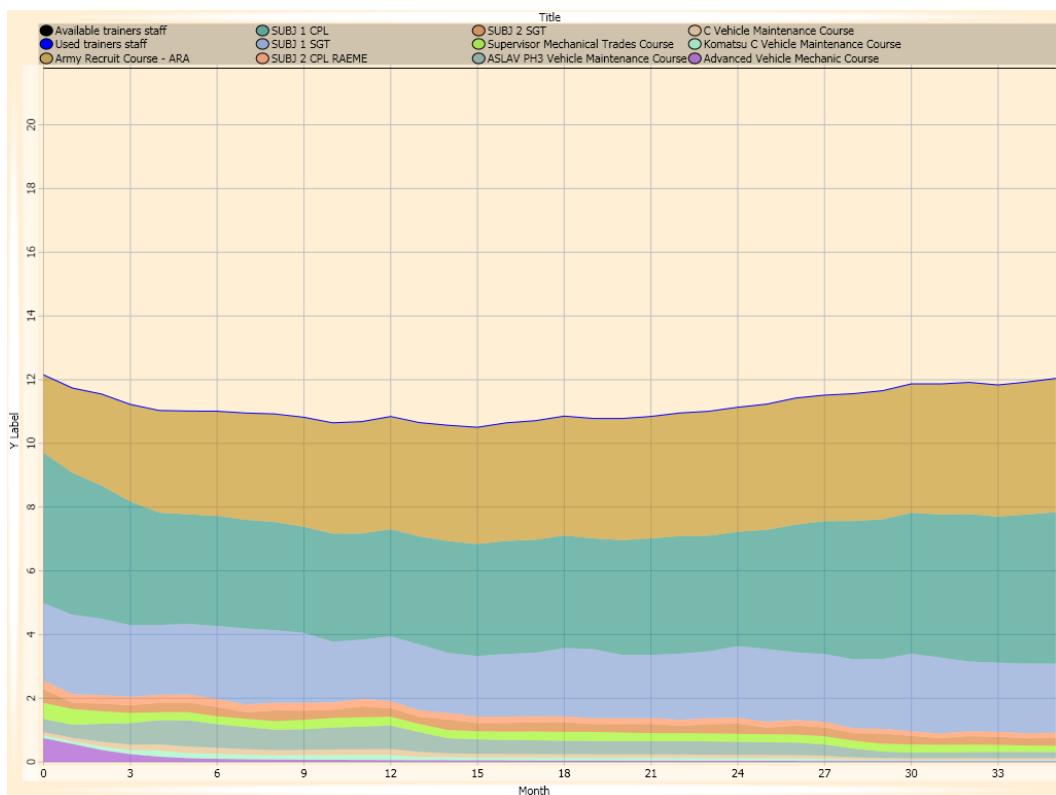
Figure 14: Mechanic Vehicle SGT
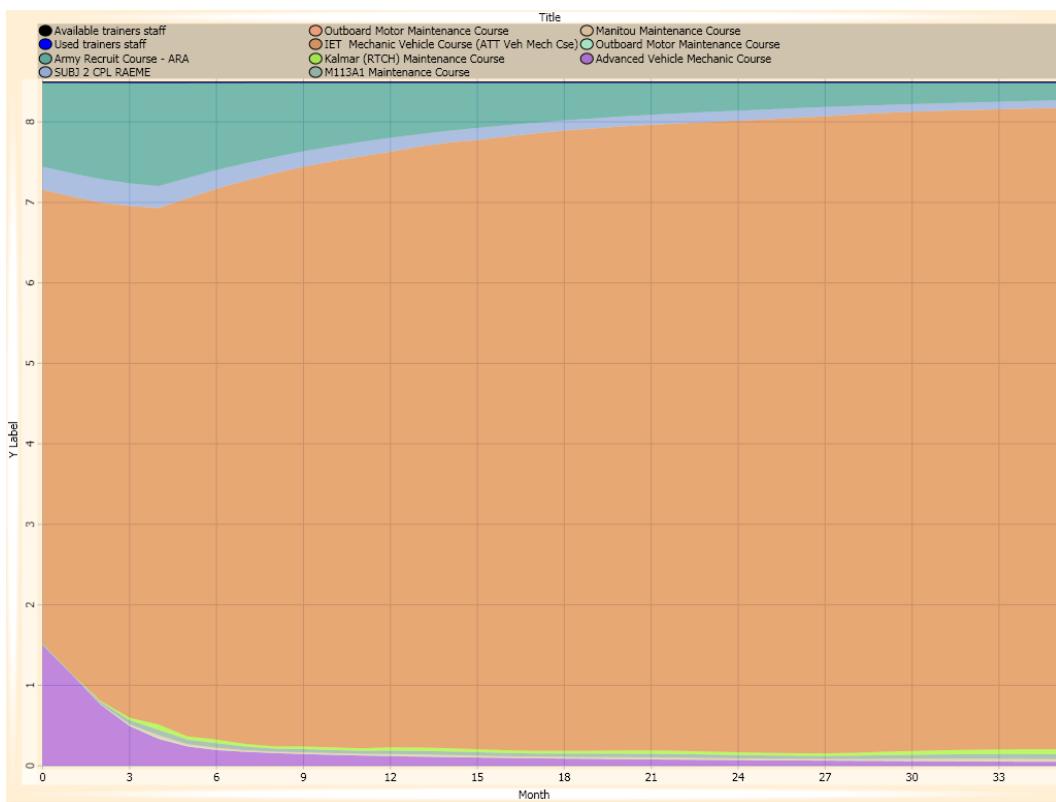
Figure 15: Mechanic Vehicle CPL
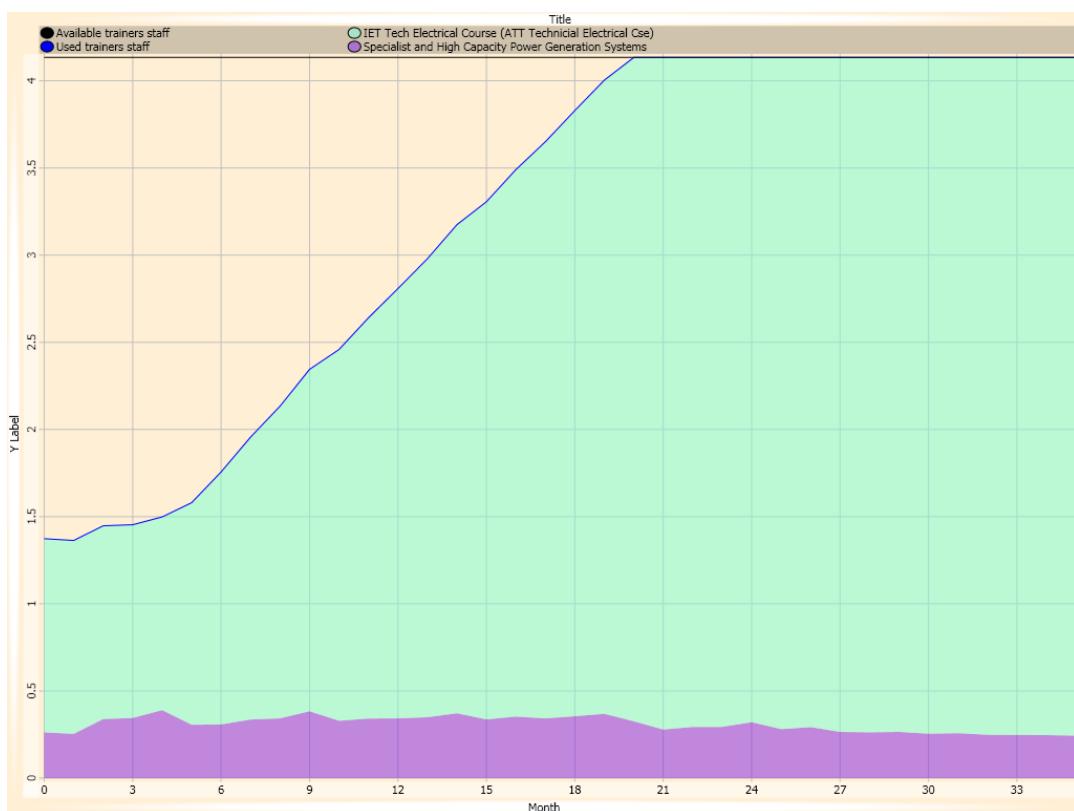
Figure 16: Technician Electrical CPL

7.1.2 Recruitment Rate -25%
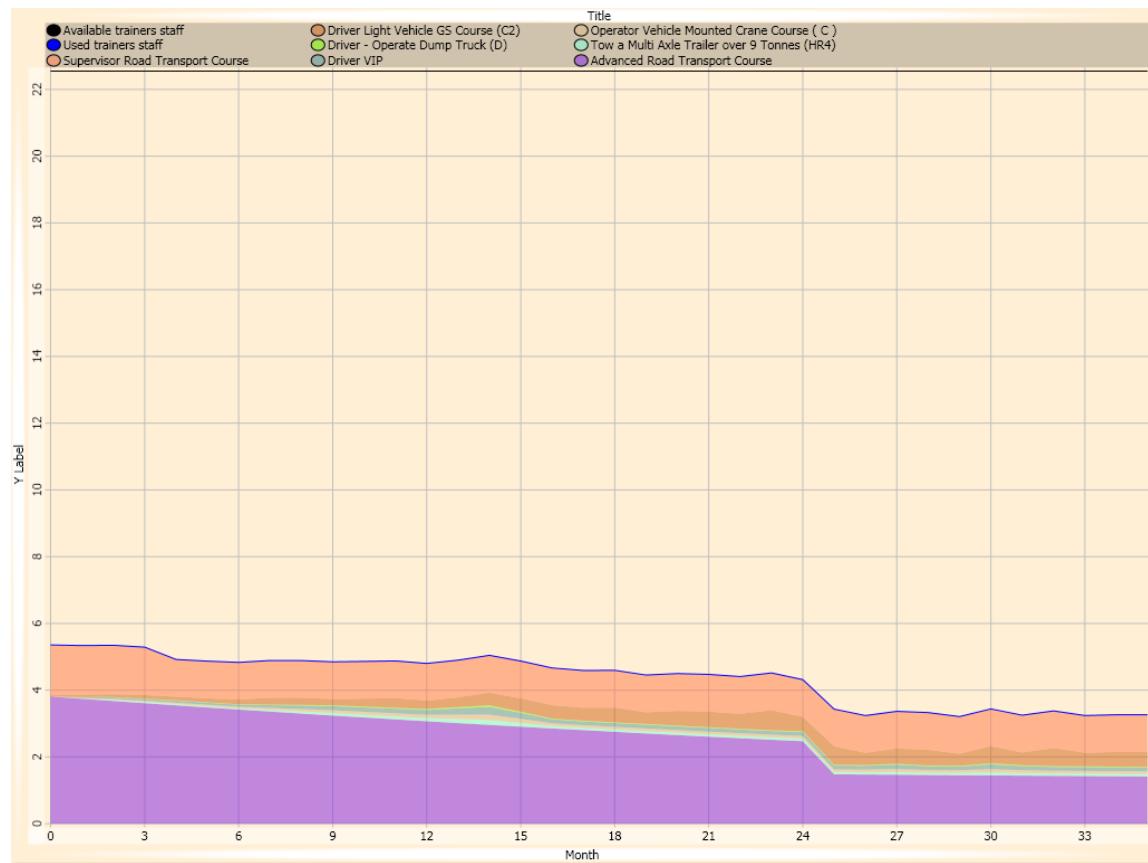
Figure 17: Supervisor Transport - Driver SGT
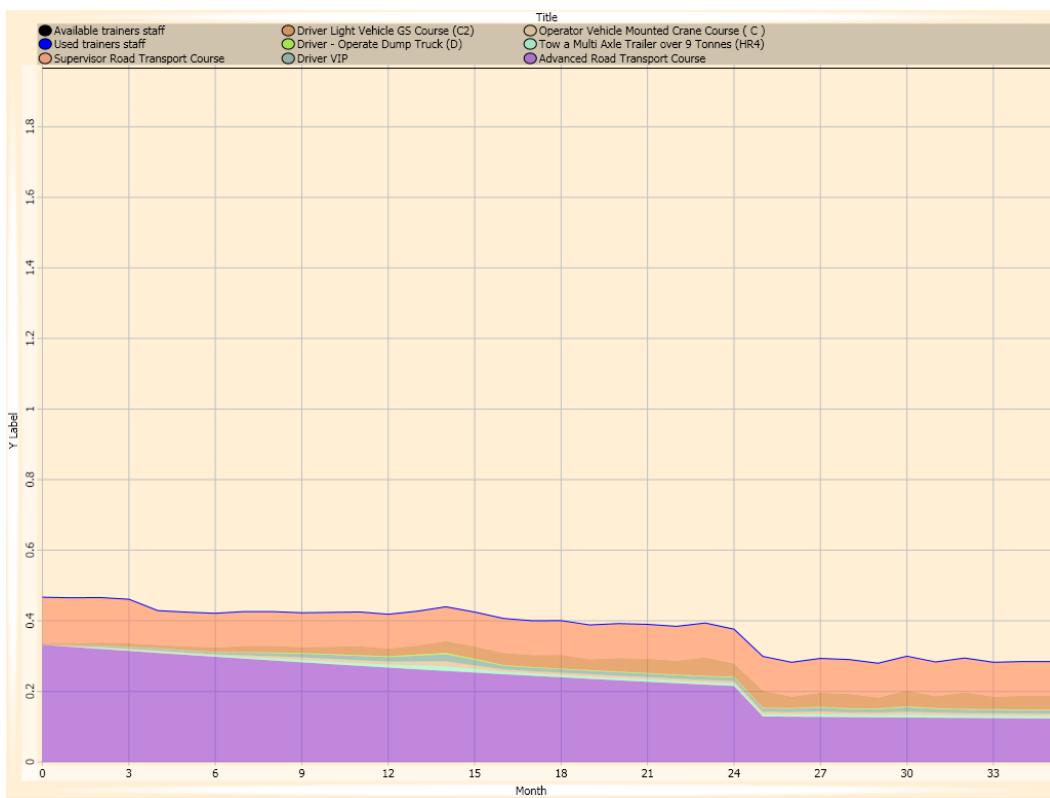
Figure 18: Supervisor Transport - Operator Specialist Vehicle SGT
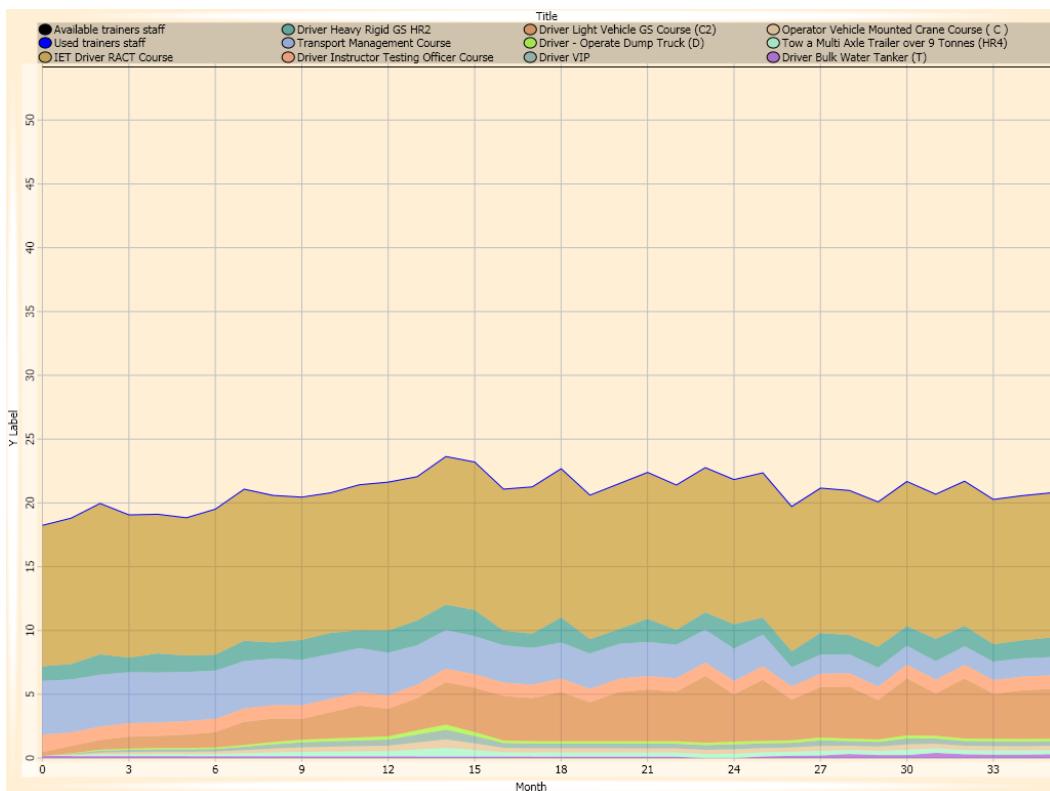
Figure 19: Supervisor Transport - Driver CPL
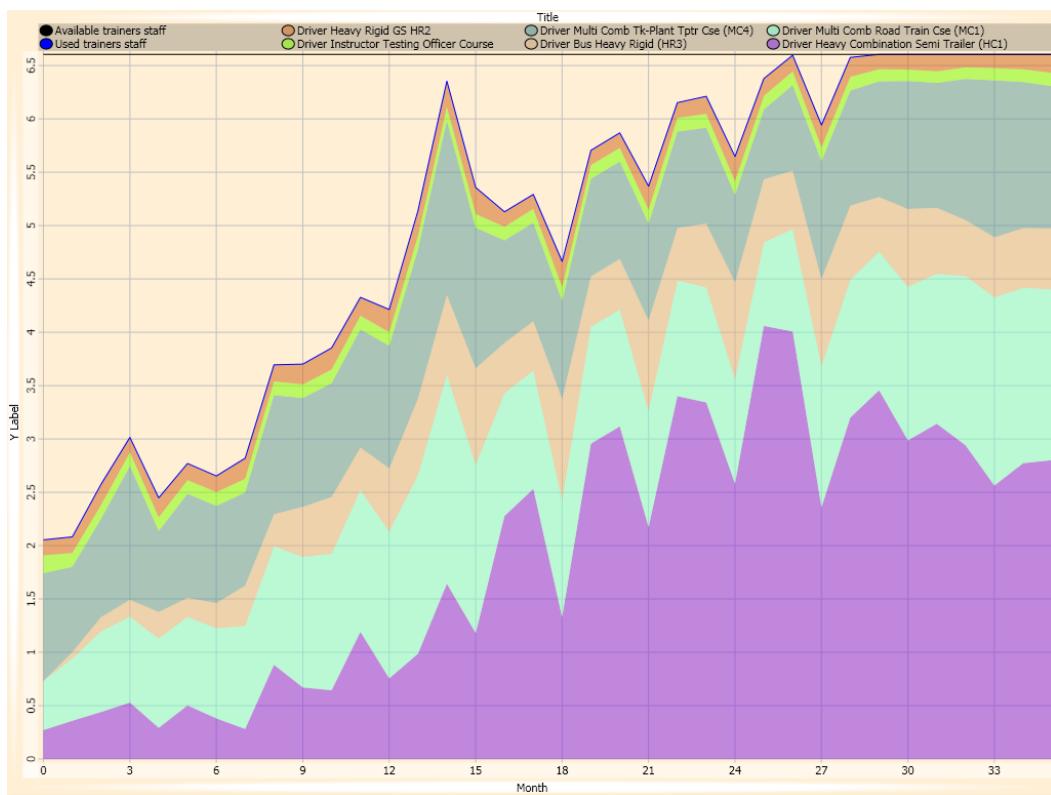
*Figure 20: Supervisor Transport Driver - Operator Specialist Vehicle CPL*
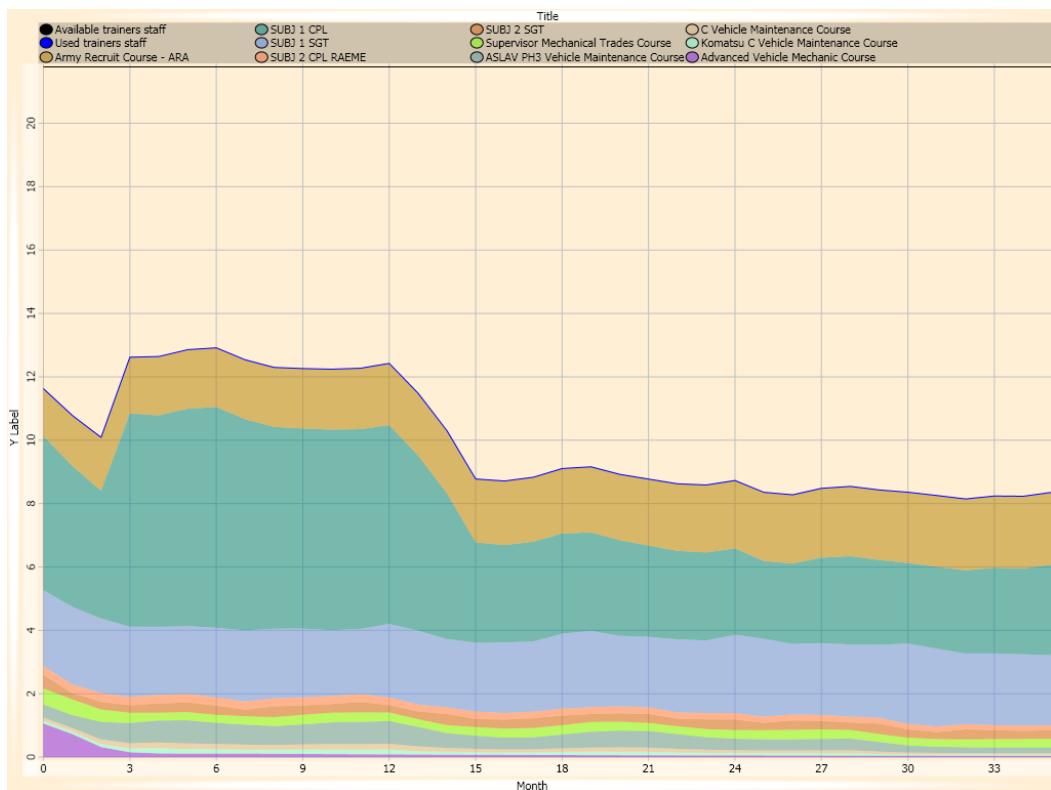

Figure 21: Mechanic Vehicle SGT
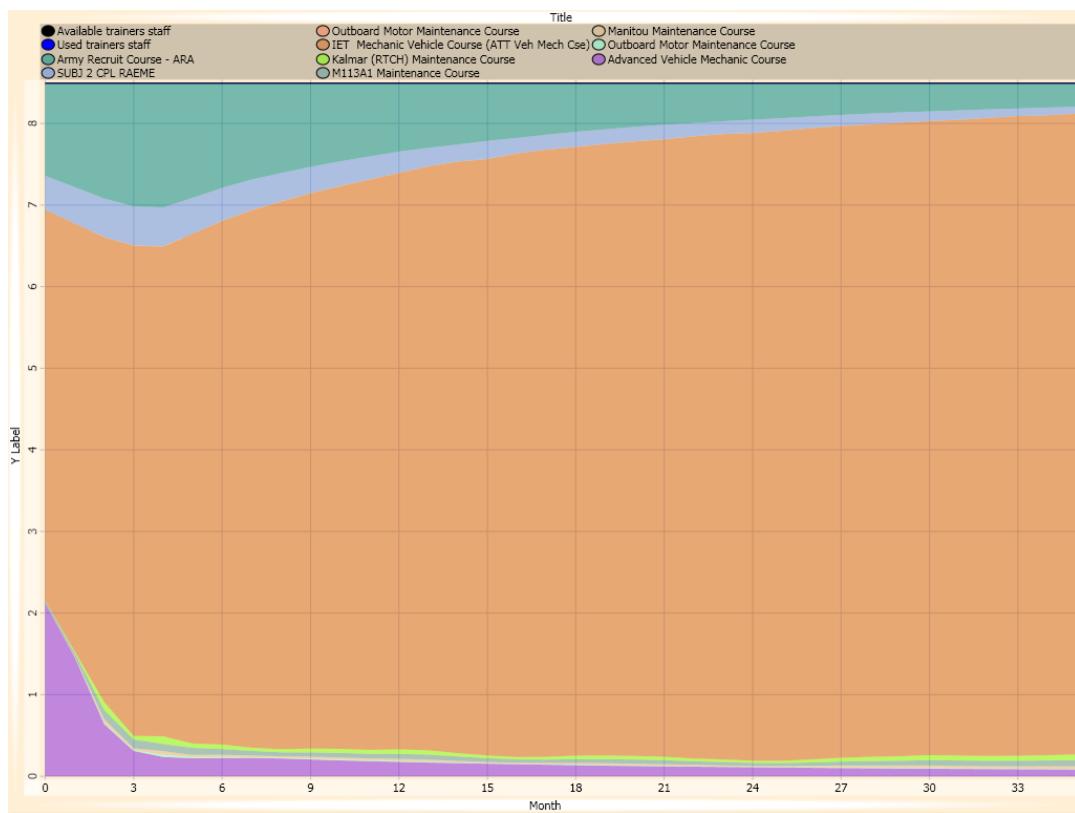
Figure 22: Mechanic Vehicle CPL
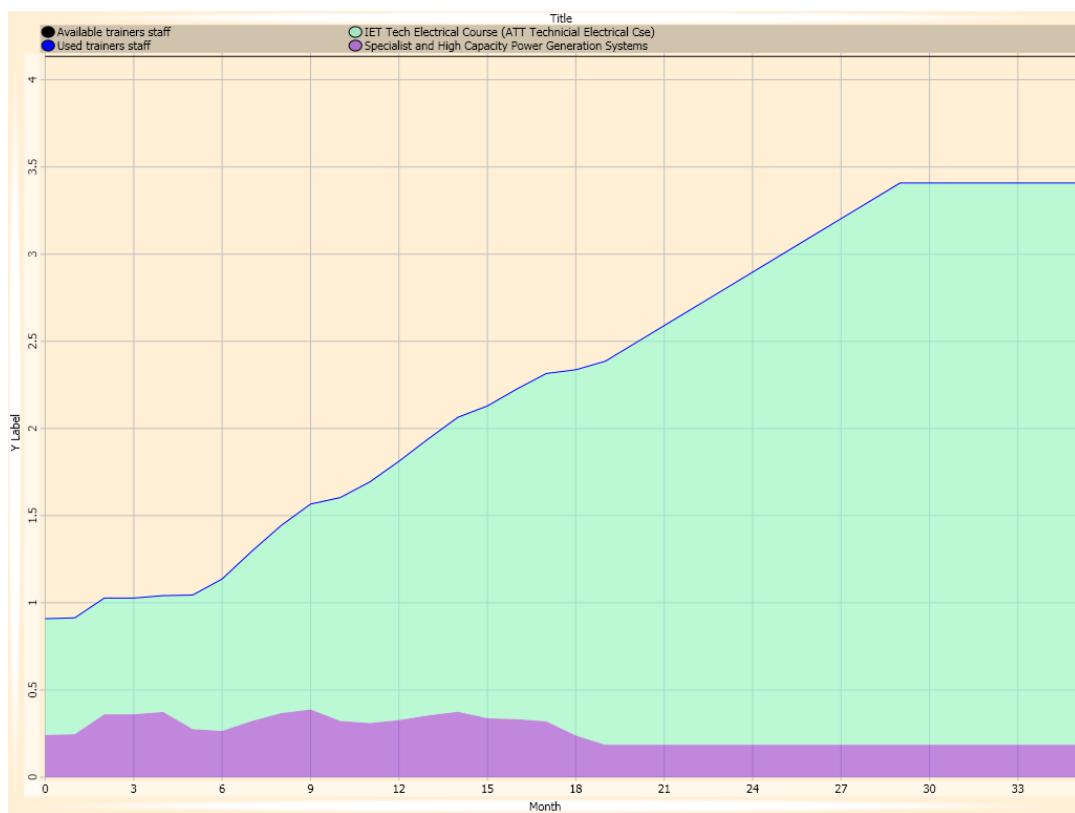
Figure 23: Technician Electrical

### 7.1.3 Separation Rates -25%
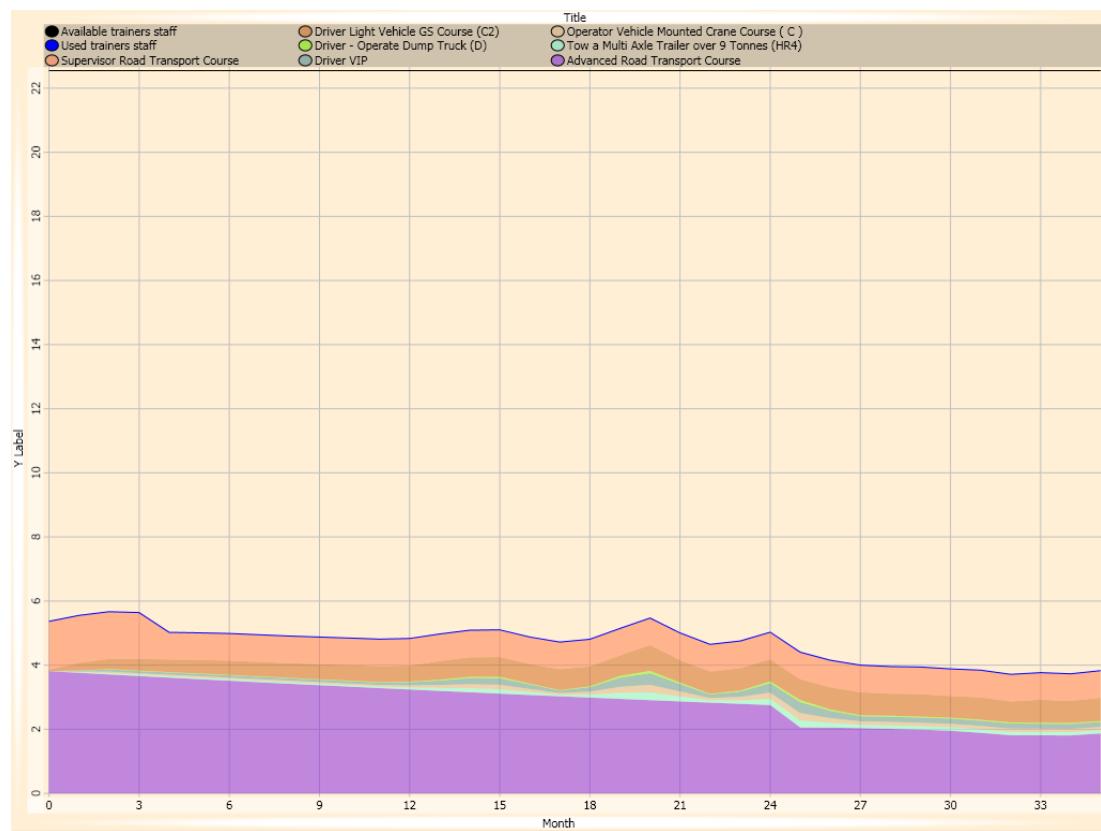
Figure 24: Supervisor Transport - Driver SGT
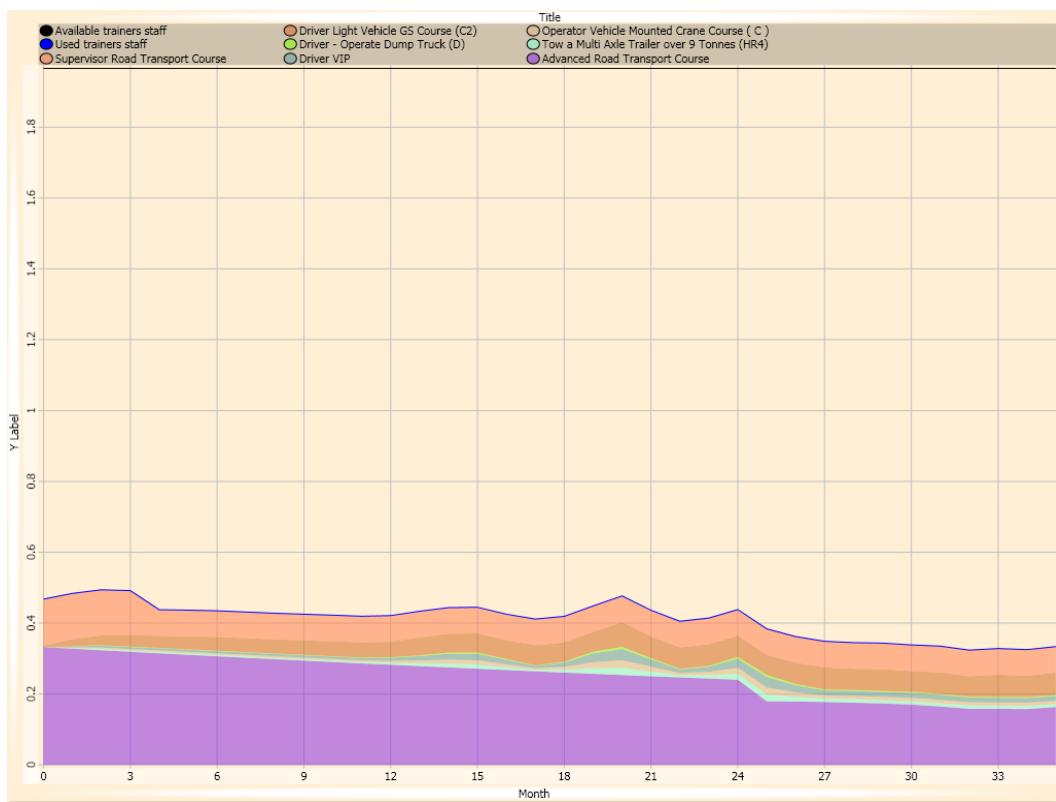
Figure 25: Supervisor Transport - Operator Specialist Vehicle SGT
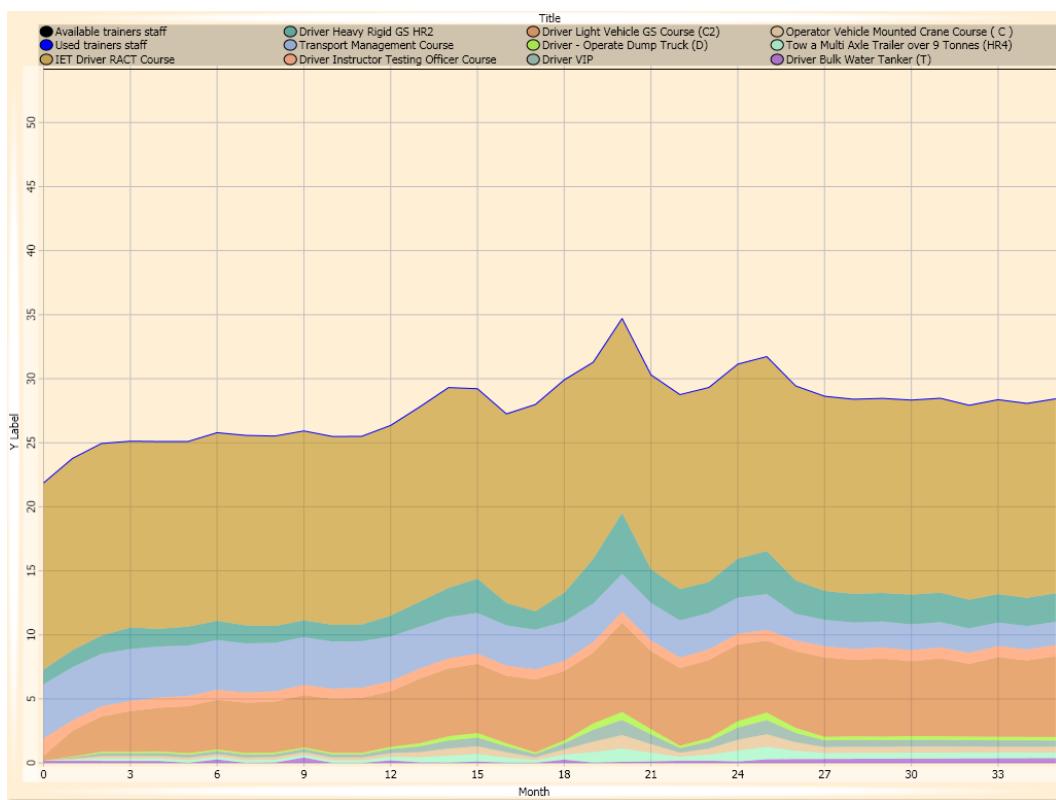
Figure 26: Supervisor Transport - Driver CPL
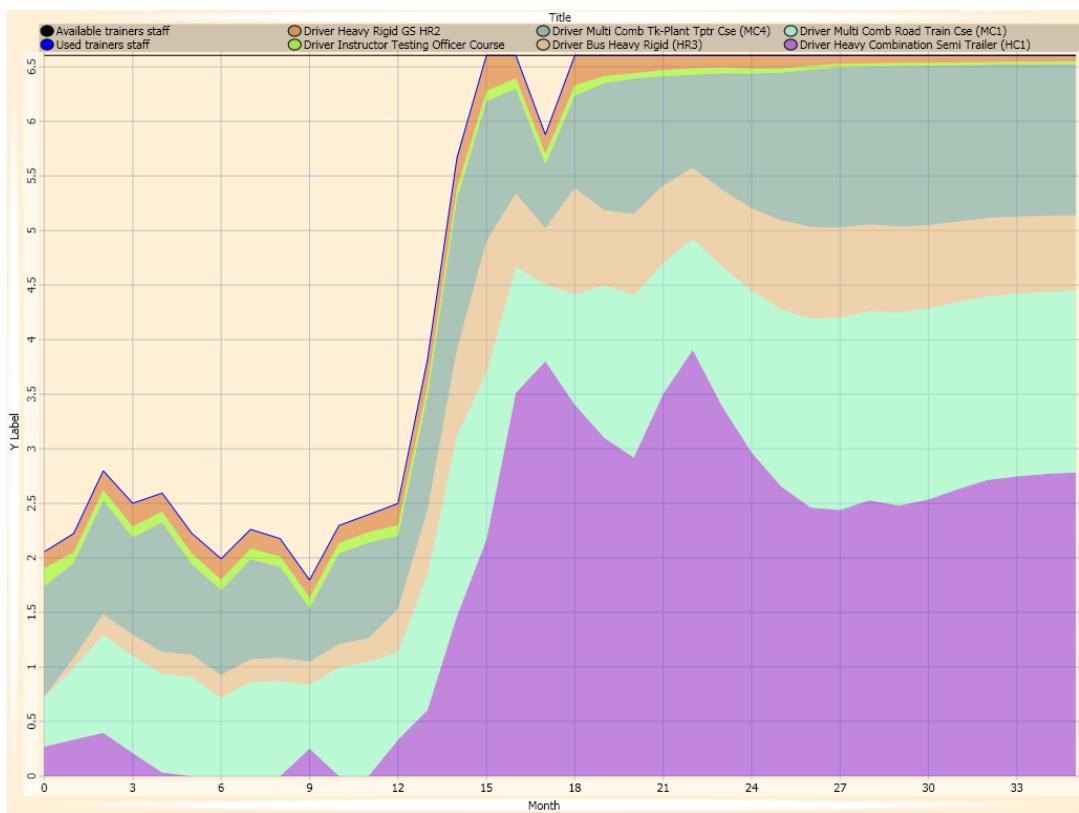
Figure 27: Supervisor Transport - Operator Specialist Vehicle CPL
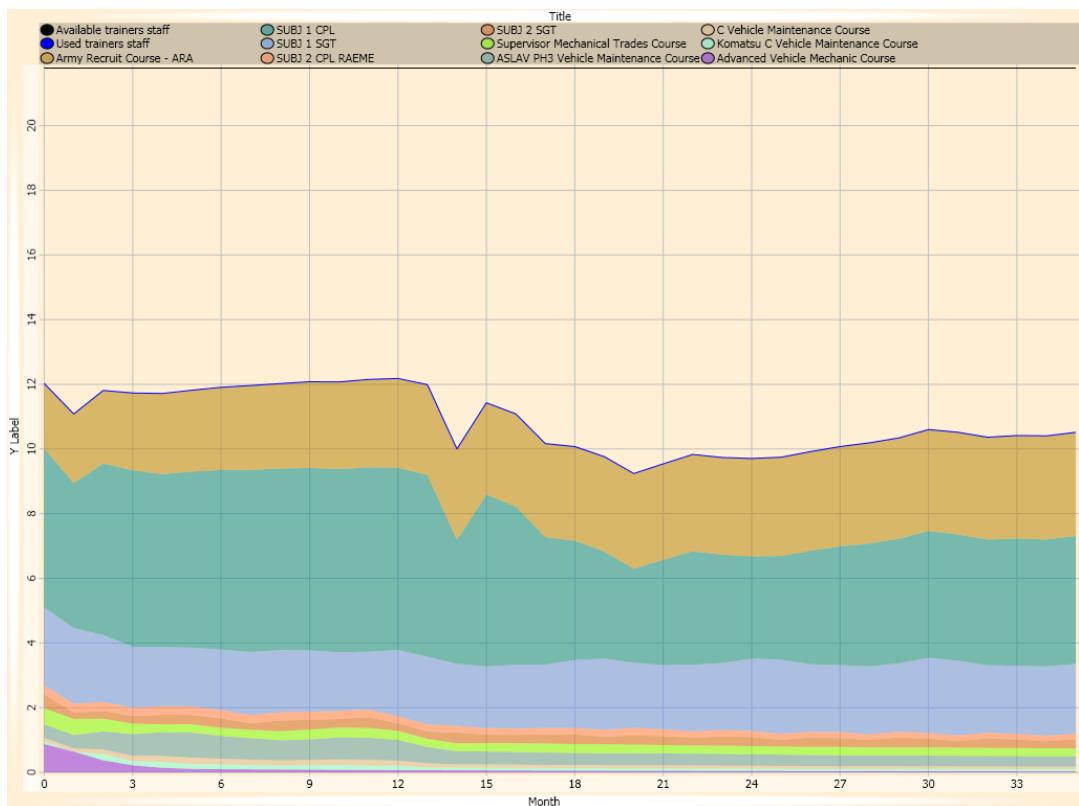
Figure 28: Mechanic Vehicle SGT
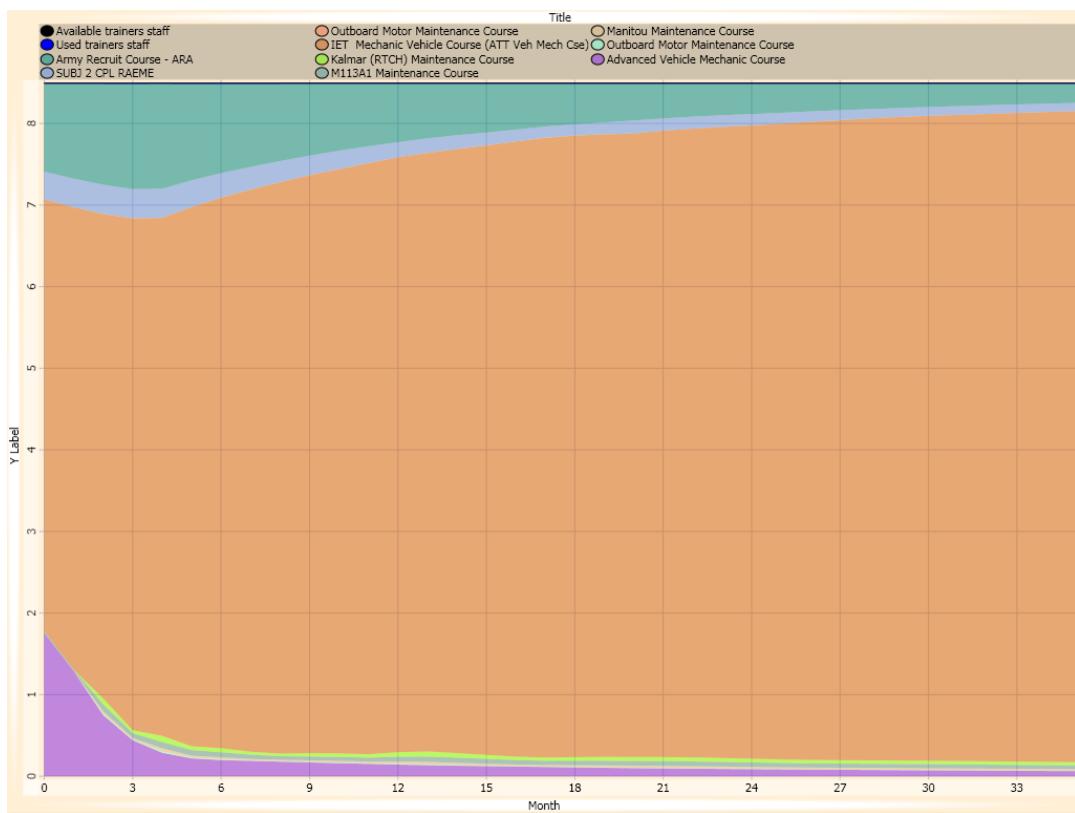
Figure 29: Mechanic Vehicle CPL
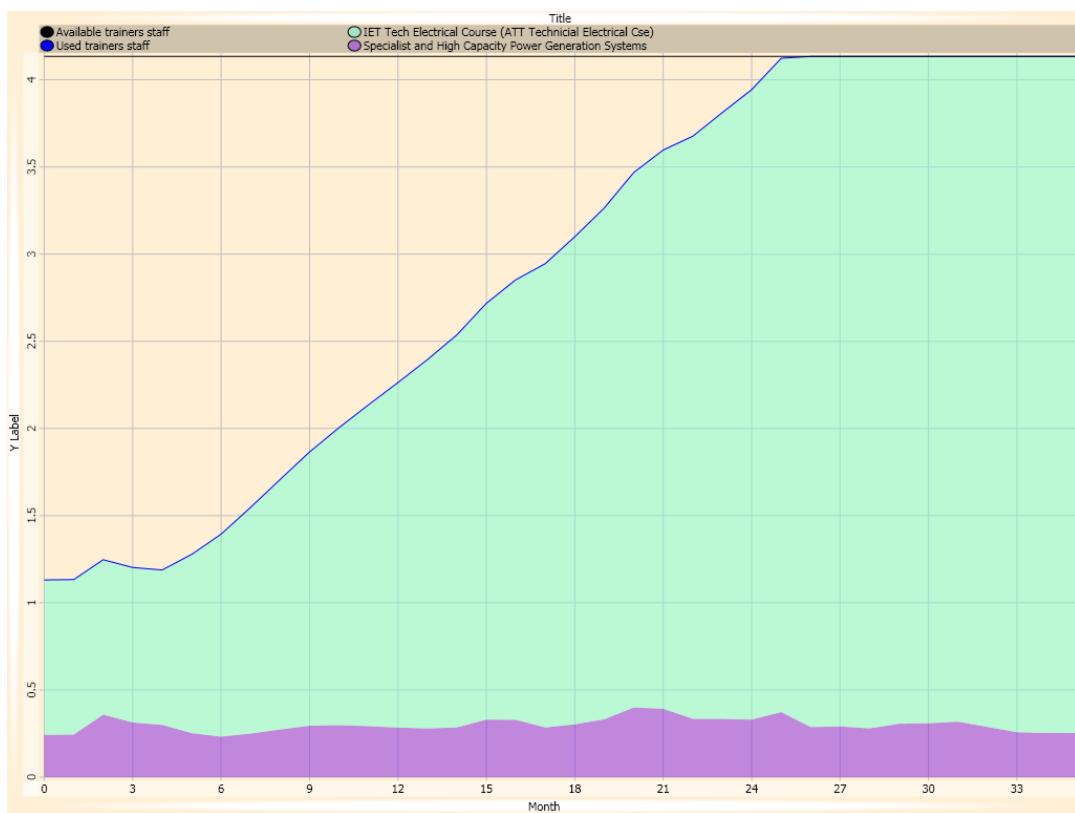
Figure 30: Technician Electrical CPL

7.1.4 Separation Rates +25%
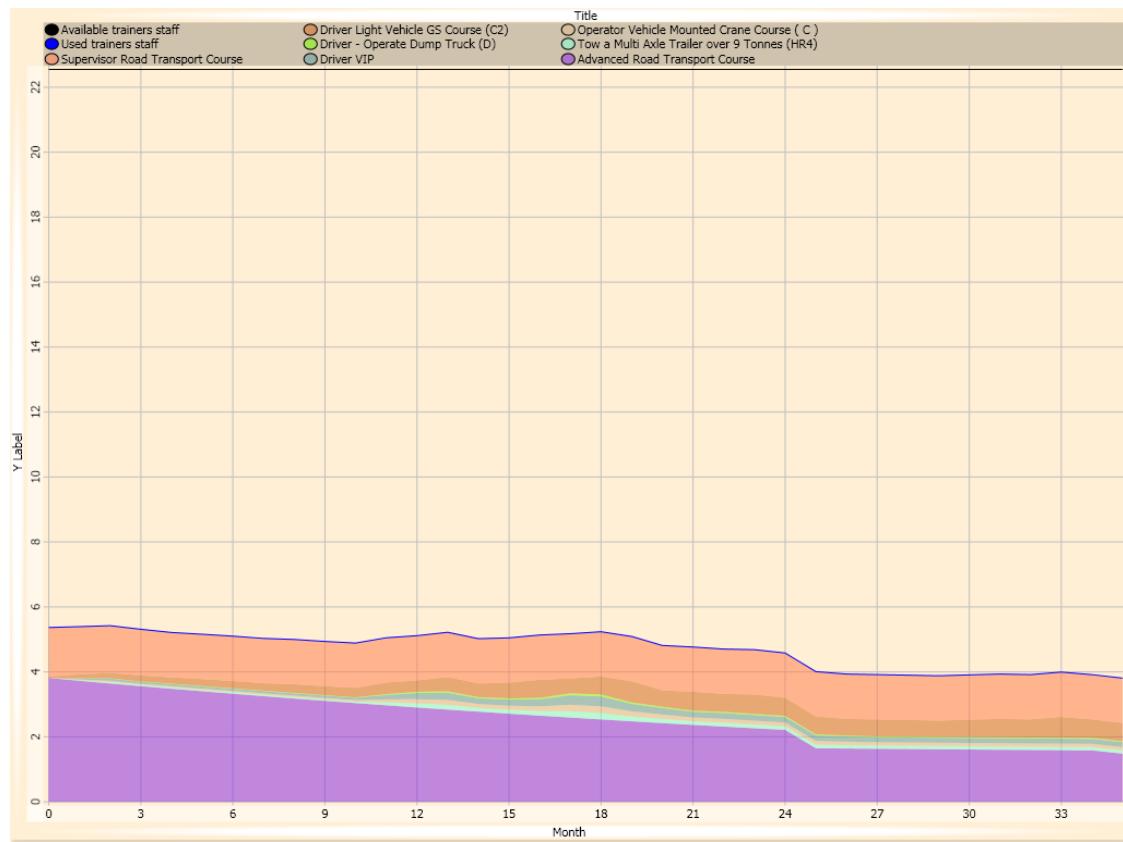

Figure 31: Supervisor Transport - Driver SGT
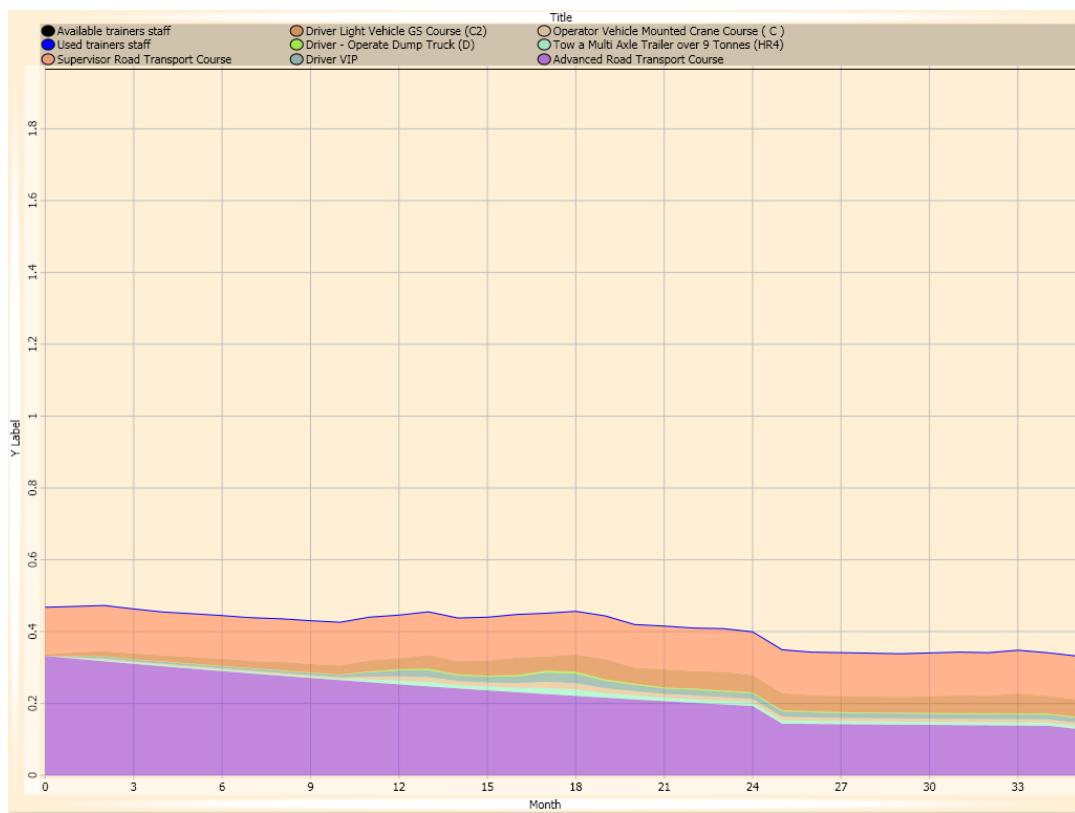
Figure 32: Supervisor Transport - Operator Specialist Vehicle SGT
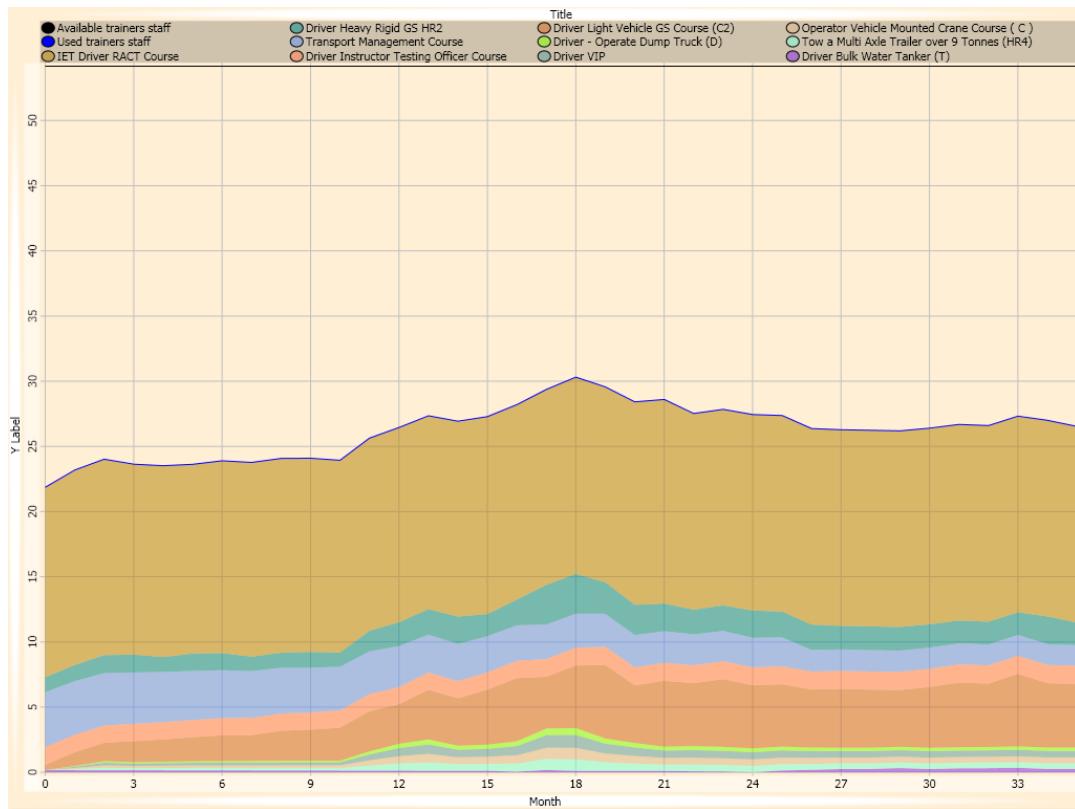

*Figure 33: Supervisor Transport - Driver CPL*
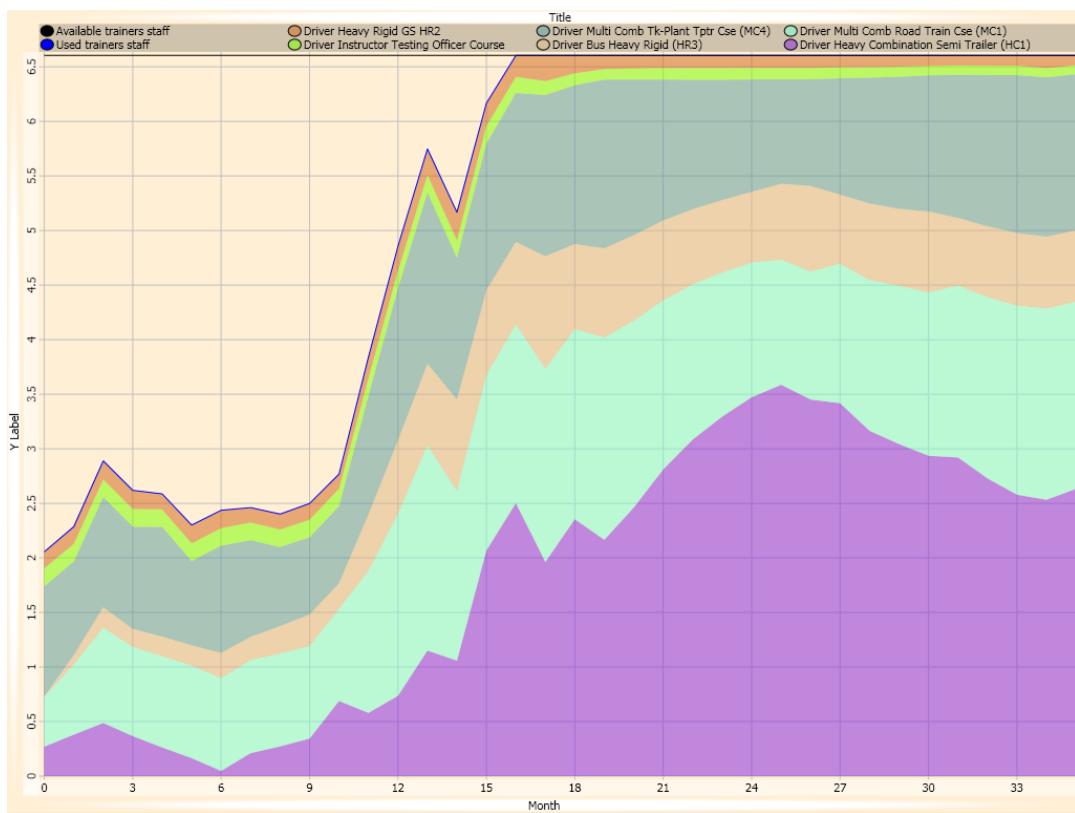
*Figure 34: Supervisor Transport - Operator Specialist Vehicle CPL*
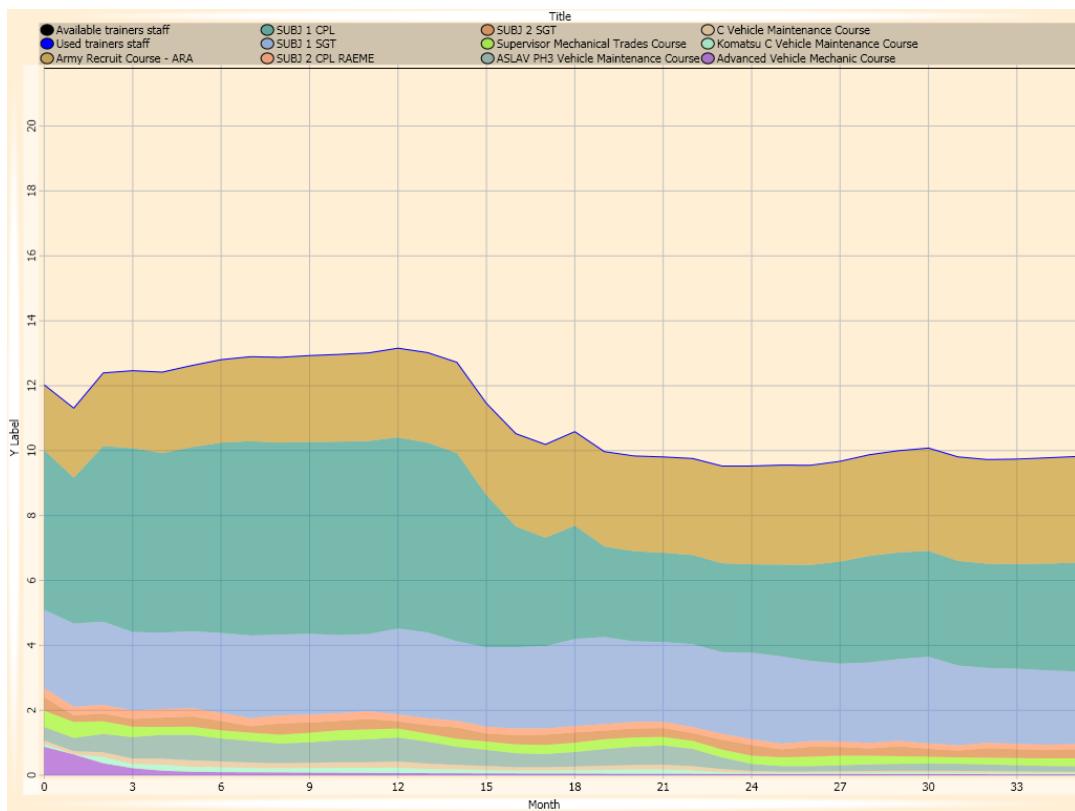

Figure 35: Mechanic Vehicle SGT
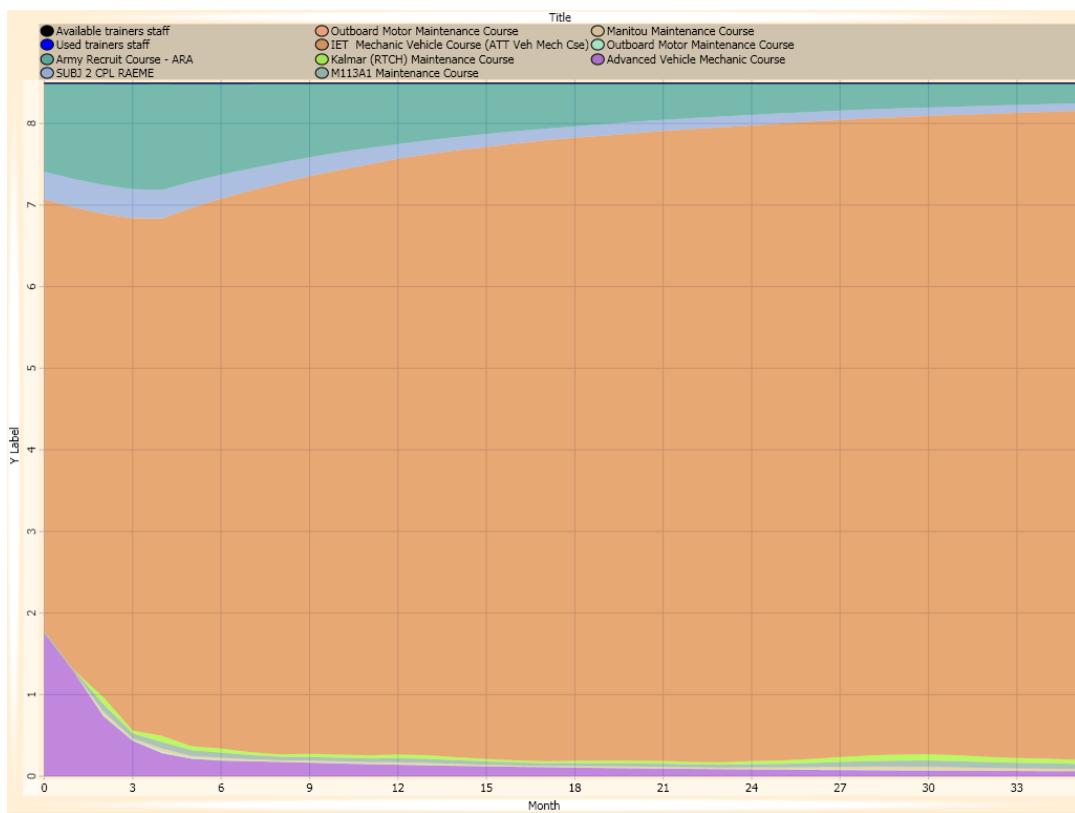
*Figure 36: Mechanic Vehicle CPL*
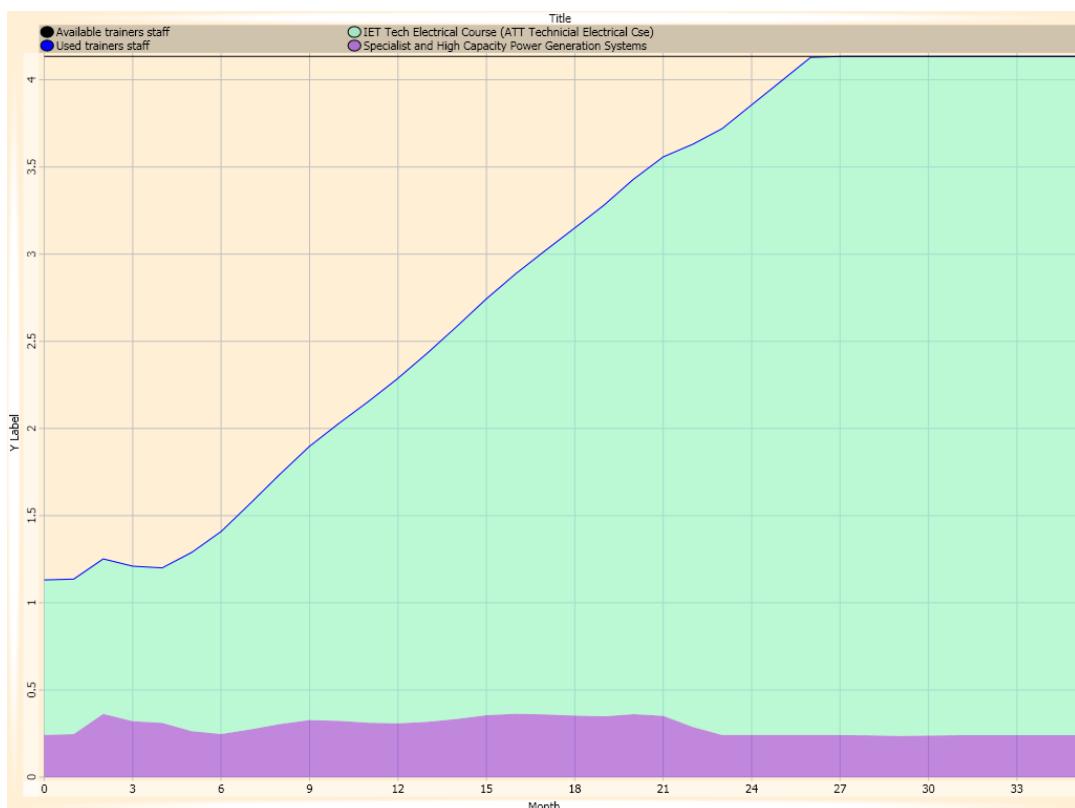
Figure 37: Technician Electrical CPL

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19. ABSTRACT
In this report we analyse Army's ability to conduct LAND 121 conversion training for the expected number of trainees in a timely manner. We make use of the Army Sustainability Modelling Analysis and Reporting Tool to forecast whether there is spare capacity (if any) for the required training staff to also instruct on the lightweight conversion course in addition to their other expected training responsibilities. Our modelling indicates that there is likely to be difficulty in sourcing the required Mechanic Vehicle - Corporal personnel to instruct on the conversion course; furthermore, there may be difficulty in sourcing the required Technician Electrical - Corporal instructors. It is recommended that the instructor establishment for Mechanic Vehicle - Corporal be increased by approximately two positions or for this role to be outsourced to contracted staff.